Research On The Laser Exposure Group Of A Business Machine

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Abstract—In the business machine, the most precise and profound part is the laser exposure group. The traditional light bulb exposure process consists of the following steps. (1) preparation (takes about 30 minutes) (2)expansion and contraction stroke (takes about 10 minutes) (3)light painting system (4)measurement and inspection (5)repair (takes about 25 minutes) (6)production of azote tablets (takes about 10 minutes) (7)repair (takes about 5 minutes) (8)exposure (takes about 10 minutes). According the above description, it is known that the traditional exposure process takes a long time and the efficiency is low. Now there are only 2 steps left to switch to a laser direct imaging system ① expansion and contraction stroke (takes about 2 minutes) ②exposure (take 10 seconds). In this way, a large number of steps can be simplified to improve efficiency and save 75% of the cost.

Keywords—laser exposure, expansion and contraction coefficient, azote tablets production, laser direct imaging system.

I. Introduction

The detailed structure of the laser exposure group of a business machine can be divided into following parts. ① asymmetric motor 1 (skew motor 1) ② synchronizing detector board: go ahead ③ asymmetric motor 2 (skew motor 2) ④ asymmetric motor 3 (skew motor 3) ⑤ polygon mirror motor ⑥ light emitting diode (LED) drive board (go ahead) ⑦ light emitting diode (LED) drive board (back forward) ⑧ synchronizing detector board (fall back).

Laser direct exposure machine have a wide range of applications. In addition to business machines, there are active and passive components of semiconductors, optoelectronic displays, back light modules, solar energy cells, light emitting diodes, brushed circuit boards, touch panels, mask making, etc. The main technology of the exposure machine is to use a focused electron beam to expose organics polymers. The chemical properties of the photoresist in the area irradiated by the electron beam radiation are changed, forming a well-solubilized area, thereby forming a fine pattern on the resist.

II. Literature Review

Regarding the maintenance technology of the laser exposure group of the business machine, here are some examples. In the literature [1], Taiwan Ricoh company made the operation method of a business machine that is produced by herself into a manual. The content is very detailed. In the literature [2], graduate student Shi Shichang researched deep violet laser exposure machine (248nm wavelength), A/B lens and laser resonant cavity combined with semiconductor process, and extended the life of laser exposure machine through the high-efficiency power curve

control. The advantage of this paper is that it can save a lot of economic costs and extend the life of laser exposure machines. The disadvantage of the paper is that the stability of the power curve control is not enough, so that the effect is often unsatisfactory. In the literature [3], graduate student Ding Mingqi applied multiple image processing algorithm logic to improve the alignment accuracy of laser exposure machines. The advantage of this paper is that the operation of the software program can improve the accuracy of the laser exposure machine without changing the circuit of the laser exposure machine or adding an integrated circuit (IC). The disadvantage of this paper is that the debugging of software programs is not easy. In the literature [4], graduate student Yang Dingli studies the optoelectronic properties of low-concentration polymer-doped liquid crystal cells exposed to He-Ne lasers. The advantage of this paper is that it is a novel feature of the laser exposure. That can extend the use of laser exposure materials to He-Ne gas. The disadvantage of this paper is that helium-neon gas is a rare gas, it is not easy to obtain and the economic cost is very high. It is not popular because it can't reduce costs.

III.   Explanation of principle

A.The introduction of the overall

business machine

Fig. 1 The appearance of a business machine

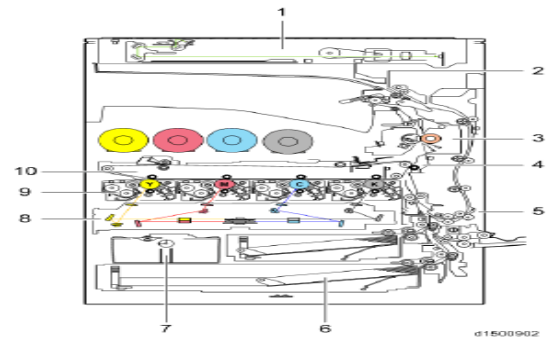B.The position of the laser exposure

group on a business machine

Fig. 2 The position of the laser exposure unit

on a business machine

8. The laser exposure group
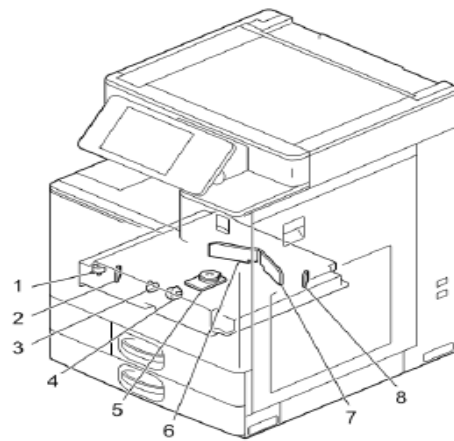
C.   The detail design of a laser exposure

group

Fig. 3 The fine construction of a laser

exposure group

1.asymmetric motor 1 (skew motor 1)
2.synchronizing detector board: (go ahead)
3.asymmetric motor 2 (skew motor 2)

4.asymmetric motor 3 (skew motor 3)

5.polygon mirror motor

6.light emitting diode (LED) drive board (go ahead)

7.light emitting diode (LED) drive board (back forward)

8.synchronizing detector board: (fall back)

IV.   The practical operation of the

Laser exposure group of a business machine

Fig. 4.Detecting the asymmetric motor of the laser exposure group

Fig. 5 Detecting the polygon mirror motor of the laser exposure group

Fig. 6 Repaired the laser exposure group

V. conclusion

The main difference between the new type of the business machine and the old type of the business machine on the laser exposure group is the adjustment of the origin of the laser diode after the unit is replaced.

(1)   The new business machine

downloads the stack pointer value (sp value) from the unit. Compared with the old model, the new model has included hand-input reference of sheet included in the unit, so that it can lift the serviceability improvement.

(2)   The new business machine use one

stack pointer value (1 sp) for the purpose of the coarse and fine adjustment. Compared with the old model, the new model adopts two stack pointer value (2 sp) which can lift the serviceability improvement.

VI. Reference

[1](July 2013), "*Service manual of Ricoh university: learning, knowledge, performance*", Ricoh Americas corporation, page 26~39.

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[3]Ding M.Q., (2014), "*Applied multiple image processing algorithm logic to improve the alignment accuracy of laser exposure machines*", master's dissertation, Zhongli, Taiwan, national central university, institute of mechanical engineering.

[4]Yang D.L., (2012), "*Research on the optoelectronic properties of low- concentration polymer-doped liquid crystal cell exposed to He-Ne lasers*", master's dissertation, Tainan, Taiwan, national Cheng Kung university, institute of optoelectronic science and engineering.