United States Patent [19]

Yabe et al.

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[54] **PREHEAT TYPE COPYING APPARATUS**

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[30] **Foreign Application Priority Data**

July 30, 1970 Japan 45/81316

[52] **U.S. Cl.** **250/317**

[51] **Int. Cl.** **G01n 21/34**

[58] **Field of Search** ..... 250/65 T

[56] **References Cited**

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[57] **ABSTRACT**

A preheat-type copying apparatus wherein an original and a heat-sensitive copying paper are placed between a heat-resisting press plate transparent to infrared rays and a cushion member. An electroconductive film for preheating the copying paper, and transparent to infrared rays, is provided on the surface of the press plate.

4 Claims, 2 Drawing Figures

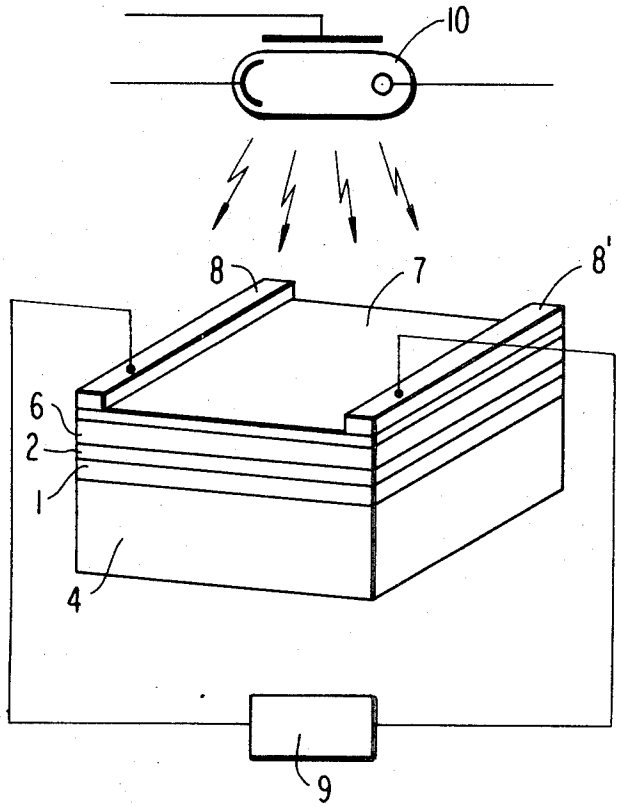


FIG. 1
PRIOR ART

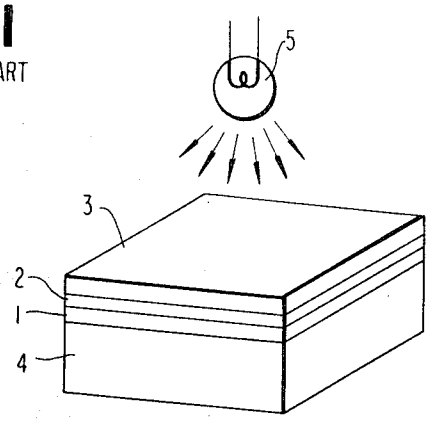
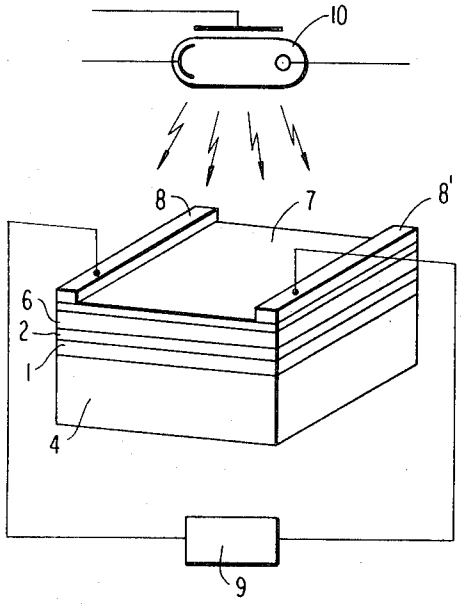


FIG. 2



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PREHEAT TYPE COPYING APPARATUS

BACKGROUND OF THE INVENTION

This invention relates to a heat-sensitive copying apparatus for reproducing an original by the irradiation of infrared rays.

In a conventional copying apparatus of this type, the original and a heat-sensitive copying paper are interleaved between a heat-resisting glass plate (or Teflon film) transparent to infrared rays and a cushion member in close contact with each other. Infrared rays then are applied from an infrared lamp to the outer side of the glass plate. In this case, the infrared rays are applied onto the copying paper until its temperature is sufficiently high to cause color-forming or reproduction. Thus, if a number of sheets of paper are continuously copies, the structural members are also heated by the infrared rays, which may result in increasing the temperature of the heat-sensitive paper to cause fogging or color formation at unnecessary areas.

However, if the heat-sensitive paper is preheated to an extent not to cause color formation, the reproduction can be conducted with less infrared energy than in the case where there is no such preheating operation. With such a preheating operation, a flash discharge lamp for instantaneously flashing the infrared energy for a short time may be used, without requiring the use of an infrared lamp of high power output using a tungsten filament of the type heretofore used.

SUMMARY OF THE INVENTION

According to one aspect of this invention, there is provided a preheat-type copying apparatus wherein an original and a heat-sensitive copying paper are placed between a heat-resisting press plate transparent to infrared rays and a cushion member, and an electroconductive film for preheating the copying paper and transparent to infrared rays is provided on the surface of the press plate.

It is an object of this invention to provide a preheat-type copying apparatus which may generate a color even with a small amount of infrared energy.

BRIEF DESCRIPTION OF THE DRAWING

The other objects, features and advantages of this invention will become apparent from the following description taken in conjunction with the accompanying drawing, in which:

FIG. 1 is a perspective view of a conventional copying apparatus; and

FIG. 2 is a perspective view of a copying apparatus constructed according to the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

In the conventional copying apparatus using infrared radiation, as shown in FIG. 1, the original 1 and a heat-sensitive copying paper 2 are interleaved between a heat-resisting glass plate 3 (or Teflon film) transparent to infrared rays and a cushion member 4. An infrared lamp 5 of high power output is utilized to create infrared radiation which is applied to the heat-sensitive copying paper 2 through the plate 3 until the temperature of the copying paper is sufficiently high to cause color formation or reproduction of the original.

In the apparatus of the present invention, as shown in FIG. 2, in order to preheat the heat-sensitive paper 2 so as not to cause fogging, a thin electroconductive film 7, such as vacuum-evaporated thin oxide film transparent to infrared rays, is coated on the surface of a press plate or glass 6, and electrodes 8, 8' are provided on the opposite edges thereof. An original paper 1 and a heat-sensitive paper 2 are superimposed and are interleaved closely between the press plate 6 and a cushion member 4 formed of any suitable material. A power supply 9 is connected to the electrodes 8 and 8' for creating an electric current so as to heat the film 7 and press plate 6, thereby preheating the heat-sensitive paper 2 in such a manner that the heat-sensitive paper 2 does not cause fogging when the infrared rays are subsequently applied for reproduction. In this case, as previously described, a flash discharge lamp 10 may be used to generate color or reproduction with only a small amount of infrared ray energy, owing to the preheating of the copying paper 2.

In experimentation, when the heat-sensitive copying paper was preheated to 50° C., a copy of sufficient clarity was obtained by exposure for approximately one one-thousandth of a second using a xenon flash lamp of 26 watts in power.

It should be understood from the foregoing description that this invention thus provides easy generation of color or reproduction with only a small amount of infrared energy.

What is claimed is:

1. In a copying apparatus utilizing infrared rays wherein an original and a heat-sensitive copying paper are placed between a heat-resisting press plate transparent to infrared rays and a cushion member, the improvement comprising: an electroconductive film for preheating the heat-sensitive copying paper and transparent to infrared rays provided on the outer surface of the press plate, and means for energizing said film.

2. The copying apparatus as claimed in claim 1, wherein said film and press plate are preheated by passing an electric current through electrodes formed on the edges of said preheating film.

3. The copying apparatus as claimed in claim 1, wherein said press plate is a glass sheet.

4. The copying apparatus as claimed in claim 1 wherein a flash discharge lamp is utilized to create the infrared rays.

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UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,751,665 Dated August 7, 1973

Inventor(s) Shinichi YABE et al

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

In the Heading

Assignee's name omitted - Insert - Fuji Photo Film Co., Ltd.
Kanagawa, Japan

Signed and sealed this 19th day of November 1974.

(SEAL)
Attest:

McCOY M. GIBSON JR.
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents

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