July 20, 1954 C. R. MAYO 2,684,301

DEVICE FOR FUSING XEROGRAPHIC IMAGES

Filed Sept. 26, 1952

FIG. 2

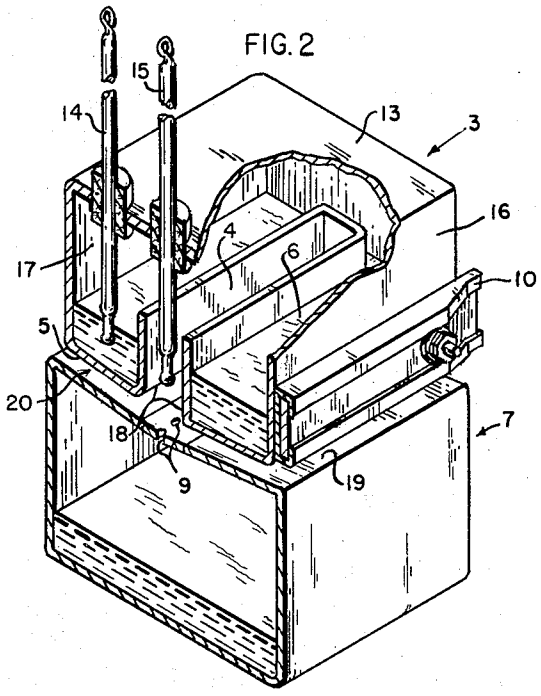
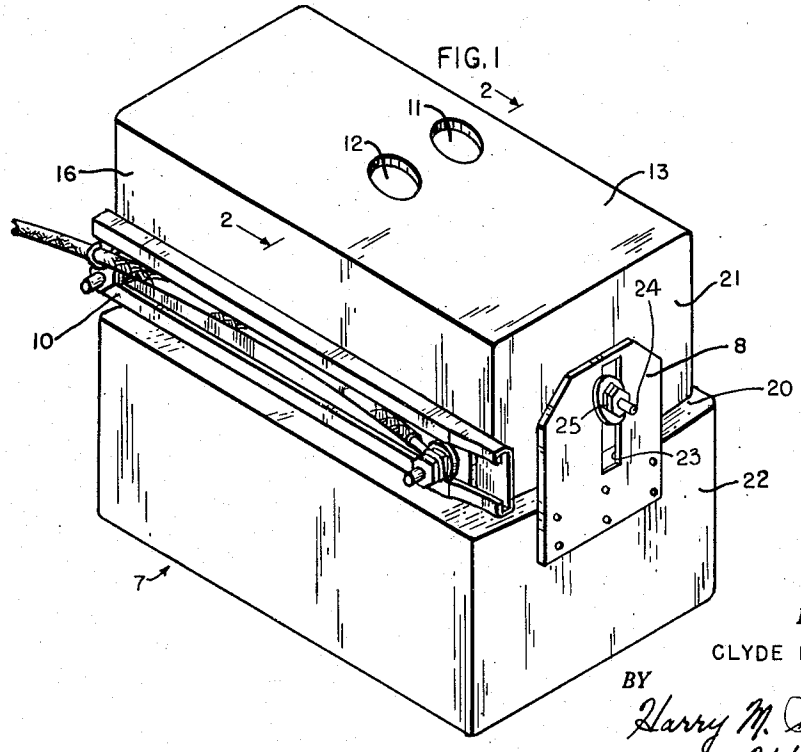


FIG. 1



INVENTOR.

CLYDE R. MAYO

BY

Harry M. Saragovitz

Attorney

Patented July 20, 1954

2,684,301

UNITED STATES PATENT OFFICE

2,684,301

DEVICE FOR FUSING XEROGRAPHIC IMAGES

Clyde R. Mayo, Rochester, N. Y., assignor to the United States of America as represented by the Secretary of the Army

Application September 26, 1952, Serial No. 311,713

4 Claims. (Cl. 95—1.9)

1

This invention relates to electrophotography and more particularly to a device for fixing or fusing xerographic powder images onto paper sheets to produce final prints.

It is an object of the present invention to provide a strip fuser which will fuse a xerographic image using the vapor solvent condensation principle.

In accordance with the present invention, there is provided a device for fusing xerographic images comprising an upper vaporizing chamber and a lower drip collecting chamber. The upper chamber is adjustably supported upon the lower chamber and is spaced therefrom so that a substantially horizontal slot of relatively constant height is provided therebetween for the passage of a sheet of paper. Within the upper chamber, there is a well for retaining a volatile liquid and heating means are provided to produce vapor from this liquid. The lower face of the upper chamber forming the upper limit of the slot has an aperture in it to allow passage of vapor from the well to the paper being developed. The upper face of the lower chamber forming the lower limit of the slot has a series of openings serving as dripholes and both faces forming the slot slope down to these dripholes.

For a better understanding of the invention, together with further objects thereof, reference is had to the following description taken in connection with the accompanying drawings and its scope will be pointed out in the appended claims.

In the drawings Fig. 1 is a perspective view of a vapor fuser and Fig. 2 is a perspective view, partially cut away, of the fuser, along line 2—2 of Fig. 1.

Referring now more particularly to Figs. 1 and 2 there is shown an upper vaporizing chamber 3 which is closed except for a vapor slot 4 in the lower face 5 of the chamber. The remainder of the base of the chamber serves as a solvent well 6 surrounding the slot. The vaporizing chamber 3 is adjustably supported on a lower drip-collecting chamber 7 by means of a pair of adjustable end flanges connecting the end walls of said chambers. This adjustability may be provided by any suitable means well known in the art such as slots 23 adapted to receive positioning stud 24. Stud 24 is maintained in position within slot 23 by nut 25. Fig. 1 shows one of such end flanges 8 connecting end walls 21 and 22. A series of dripholes 9 are positioned directly under vapor slot 4. A strip heater 10 is clamped along one side of vaporizing chamber 3 near its bottom edge and is powered from a variac auto-transformer

2

(not shown) or other suitable means. A pair of apertures 11 and 12 are provided in upper face 13 of the vaporizing chamber in which two immersion thermometers 14 and 15 may be mounted to check the solvent and vapor temperatures. That part of lower face 5 which comprises the base 18 of the well 6 in chamber 3 slopes medially downward from side walls 16 and 17. The upper face 19 of lower chamber 7 has sloping portions on either side of the dripholes which are substantially parallel to base 18 of well 6 and a substantially horizontal space 20 of relatively constant height for the passage of a sheet of paper or other suitable material is provided between base 18 of well 6 and upper face 19 of chamber 7.

In operation, the height of the chamber 3 above the chamber 7 is adjusted by connecting flanges 8 to provide a gap of approximately one-quarter inch or any other suitable spacing. The solvent well 6 is partly filled with a volatile solvent such as perchlorethylene and power applied to heater 10. When using perchlorethylene, a vapor temperature in the range of between 80° C. and 100° C. appear to give the best results. After a preliminary warm-up period, a 20–25 watts input to the strip heater is sufficient to maintain a vapor temperature in the desired range. Different solvents having the proper vapor pressure and other necessary properties may be used.

Sheets of paper carrying powder images, passed through the paper slot with the image side facing upward, are fixed by a single pass taking three seconds for an eleven inch length of paper. Microscopic comparison of fused and unfused images indicate that little or no loss of definition is associated with solvent fixing.

While there has been described what is at present considered to be the preferred embodiment of the invention, it will be obvious to those skilled in the art that various changes and modifications may be made therein without departing from the invention, and it is, therefore, aimed in the appended claims to cover all such changes and modifications as fall within the true spirit and scope of the invention.

What is claimed is:

1. A device for fusing xerographic images comprising an upper vaporizing chamber and a lower drip collecting chamber, said upper chamber being adjustably supported upon and spaced from said lower chamber to provide a substantially horizontal slot of relatively constant height therebetween for receiving material having said image, means for adjusting the height of said slot, a plurality of spaced wells within said up-

per chamber for retaining a volatile liquid, means for heating said liquid to produce vapor, the face of said upper chamber forming upper limit of said slot having an aperture therein to allow passage of said vapor to said material, the face of said lower chamber opposite said upper chamber face having therein a plurality of dripholes disposed under said aperture, both of said faces tapering inwardly to said dripholes.

2. A device for fusing xerographic images as in claim 1 wherein said means for adjusting height of said slot comprises a plurality of adjustable flanges connecting said chambers.

3. A device for fusing xerographic images as in claim 1 wherein said means for heating said liquid comprises a strip heater.

4. A device for fusing xerographic images comprising an upper vaporizing chamber and a lower drip collecting chamber, said upper chamber being adjustably supported upon and spaced from said lower chamber to provide a substantially horizontal slot of relatively constant height

therebetween for receiving material having said image, a pair of adjustable flanges connecting end walls of said chambers, a well within said upper chamber for retaining a volatile liquid, a strip heater attached to said upper chamber to produce vapor from said liquid, the face of said upper chamber forming upper limit of said slot having an aperture therein to allow passage of said vapor to said material, the face of said lower chamber opposite said upper chamber face having therein a plurality of dripholes disposed under said aperture, both of said faces tapering inwardly to said dripholes.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
1,795,220	Langener	Mar. 3, 1931
2,009,962	Kurten	July 30, 1935
2,172,783	Alink et al.	Sept. 12, 1939
2,333,733	Morse	Nov. 9, 1943