

[54] METHOD AND APPARATUS FOR FUSER  
ASSEMBLY COOLING IN AN  
ELECTROSTATOGRAPHIC MACHINE

[75] Inventor: William E. Jordan, Penfield, N.Y.

[73] Assignee: Xerox Corporation, Stamford, Conn.

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219/216, 219/388

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355/30; 117/21; 219/216, 388, 469-471;  
34/160; 263/6 E

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Primary Examiner—Robert P. Greiner

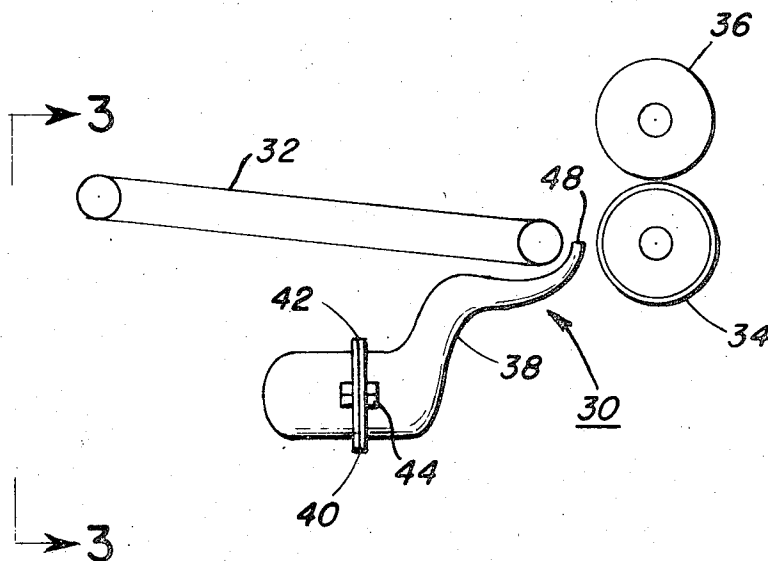
Attorney—James J. Ralabate et al.

[57]

ABSTRACT

An assembly is provided having elongated slot disposed about the vicinity of a fuser assembly including a fuser roller. The gaseous medium about such vicinity is caused to be vented to the atmosphere by passage through such assembly by activating a fan in fluid communication on the suction side thereof with the assembly.

7 Claims, 5 Drawing Figures



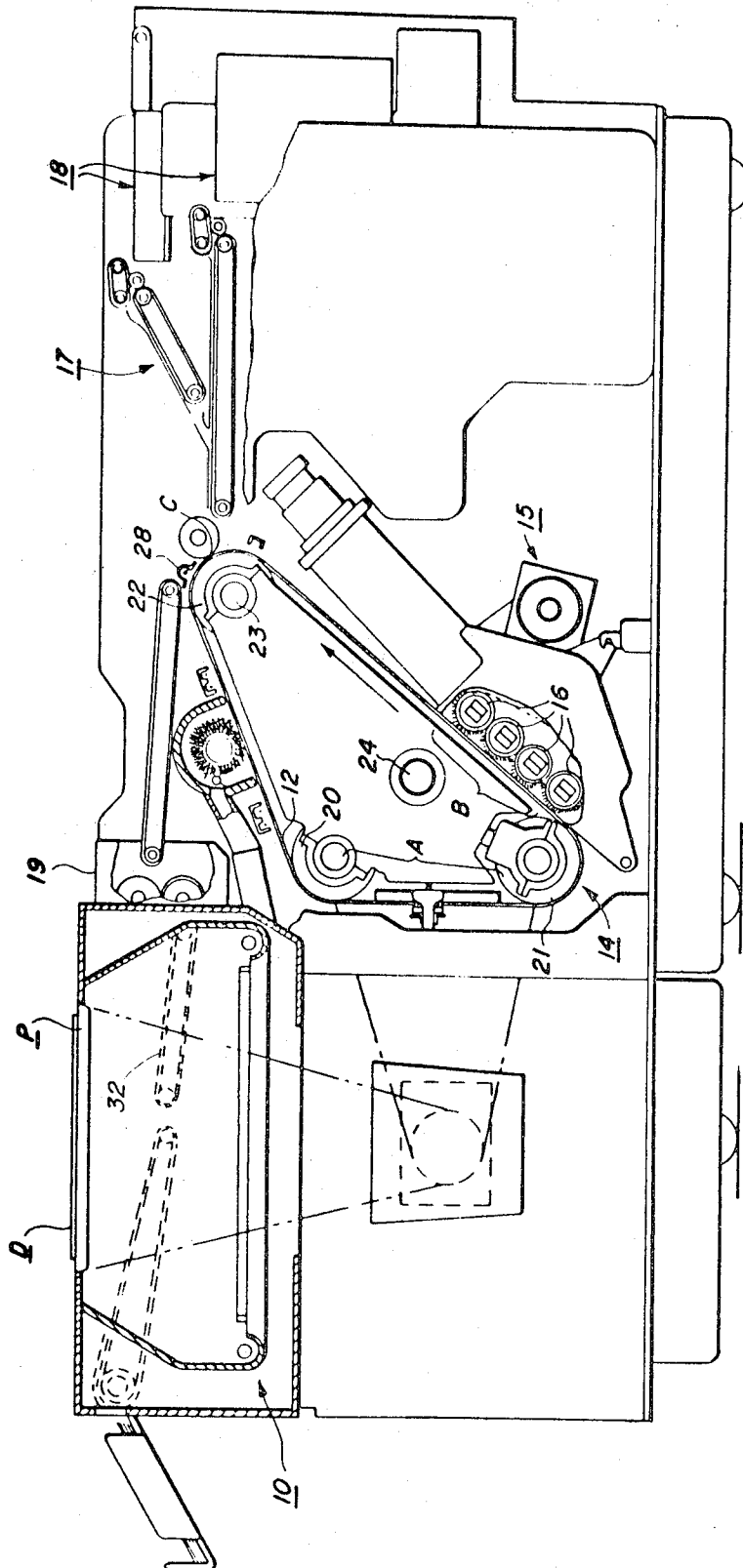


Fig. 1.

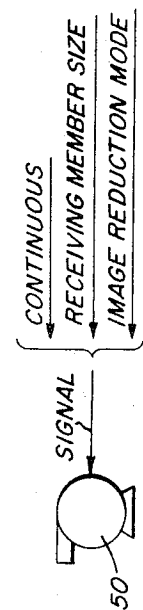


Fig. 5.

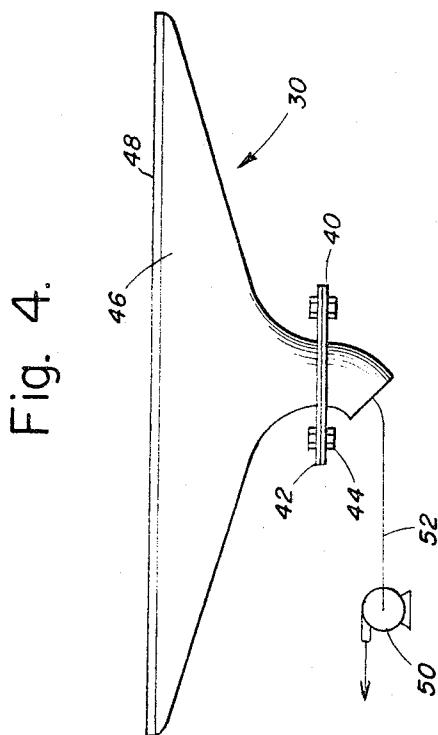


Fig. 4.

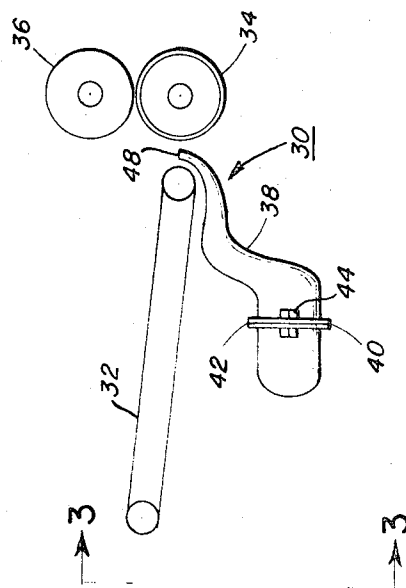


Fig. 2.

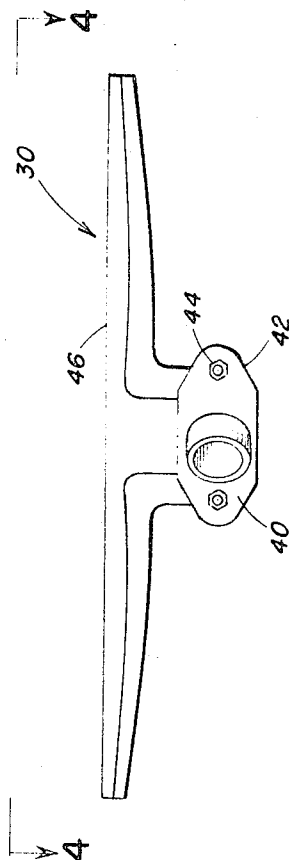


Fig. 3

# METHOD AND APPARATUS FOR FUSER ASSEMBLY COOLING IN AN ELECTROSTATOGRAPHIC MACHINE

## BACKGROUND OF THE INVENTION

This invention relates to electrostatography, and more particularly to a method and apparatus for withdrawing the gaseous media in the vicinity of the nip of a fuser assembly of an electrostatographic apparatus.

In the practice of xerography as described in U.S. Pat. No. 2,297,691 to Chester F. Carlson, a xerographic surface comprising a layer of photoconductive insulating material affixed to a conductive backing is used to support electrostatic images. In the usual method of carrying out the process, the xerographic plate is electrostatically charged uniformly over its surface and then exposed to a light pattern of the image being produced to thereby discharge the charge in the areas where light strikes the layer. The undischarged areas of the layer thus form an electrostatic charge pattern in conformity with the configuration of the original light pattern.

The latent electrostatic image may then be developed by contacting it with a finely divided electrostatically attractable material, such as a resinous powder. The powder is held in the image areas by the electrostatic fields on the layer. Where the field is greatest, the greatest amount of material is deposited; and where the field is least, little or no material is deposited. Thus, a powder image is produced in conformity with the light image of the copy being reproduced. The powder is subsequently transferred to a sheet of paper or other surface and suitably affixed to thereby form a permanent print.

The toner may be fixed by passing the sheet of paper or other surface including the transferred image between a heated roller and a second roller in pressure contact therewith whereby the toner becomes fused to the sheet of paper. In accordance with such techniques, the temperature to which the toner is generally raised is a temperature (for a given pressure) at which the toner particles coalesce or flow together and wet the paper surface to effect thereby a permanent bond. The heated or fuser roller is generally a sleeve formed of a heat conductive material, for example, copper, whereas the contact or pressure roller is a sleeve having a thick outer layer of a resilient material, such as rubber coated with a protective layer of a heat resistant material, e.g., Teflon (available from DuPont). When the two rollers are placed in pressure contact, a nip of sufficient width is developed to fix efficaciously the toner to the image receiving member. The temperature to which the heated or fuser roller is raised is sufficiently high to cause a high humidity condition to exist about the vicinity of the nip of the fuser assembly and the post-fusing transport assembly which may deleteriously affect the post-fusing transport of an image receiving member as well as give rise to an overheating condition.

## OBJECTS OF THE INVENTION

An object of this invention is to provide a novel method and apparatus for removing the atmosphere in the vicinity of the nip of a fuser assembly.

Another object of this invention is to provide a novel method and apparatus for conditioning the image re-

ceiving member for subsequent transport after passage thereof through a fuser assembly.

## SUMMARY OF THE INVENTION

These and other objects of the invention are obtained by providing a manifold assembly having an elongated slot disposed in the vicinity of the nip of a fuser assembly and a post-fusing assembly therefor. The manifold is provided with an outlet connected by a conduit to the suction side of a fan which upon activation in response to a signal during operation of the machine cause the removal of the gaseous medium about the vicinity of the nip of the fuser assembly for subsequent venting to the atmosphere.

## DESCRIPTION OF THE DRAWINGS

A better understanding of the present invention as well as other objects and further features thereof will become apparent upon consideration of the following detailed disclosure thereof, especially when taken with the accompanying drawings, wherein like numerals designate like parts throughout.

FIG. 1 is a schematic sectional view of an electrostatic reproduction machine embodying the principles of the invention;

FIG. 2 is a side view of the manifold assembly disposed in the vicinity of the nip of the fuser assembly; FIG. 3 is a rear view of the manifold assembly;

FIG. 4 is a top view of the manifold assembly including a schematic flow diagram of the method of operation thereof; and

FIG. 5 is a schematic representation of the manifold fan activating means.

For a general understanding of the illustrated copier/reproduction machine in which the invention may be incorporated, reference is had to FIG. 1 in which the various system components for the machine are schematically illustrated. A document D to be copied is placed upon a transparent support platen P fixedly arranged in an illumination assembly, generally indicated by the reference number 10, positioned at the left end of the machine. Light rays from an illumination system are flashed upon the document to produce image rays corresponding to the informational areas. The image rays are projected by means of an optical system onto the photosensitive surface of a xerographic plate in the form of a flexible photoconductive belt 12 arranged on a belt assembly, generally indicated by the reference numeral 14.

The belt 12 comprises a photoconductive layer of selenium which is the light receiving surface and imaging medium for the apparatus, on a conductive backing. The surface of the photoconductive belt is made photosensitive by a previous step of uniformly charging the same by means of a corona generating device or coronotron 13.

The belt is journaled for movement upon three rollers 20, 21 and 22 positioned with their axes in parallel. The photoconductive belt assembly 14 is slidably mounted upon two support shafts 23 and 24 with the roller 22 rotatably supported on the shaft 23 which is secured to the frame of the apparatus and is rotatably driven by a suitable motor and drive assembly (not shown) in the direction of the arrow at a constant rate. During exposure of the belt 12, the portion exposed is that portion of the belt running between rollers 20 and 21. During such movement of the belt 12, the reflected

light image of such original document positioned on the platen is flashed on the surface of the belt to produce an electrostatic latent image thereon at exposure station A.

As the belt surface continues its movement, the electrostatic image passes through a developing station B in which there is positioned a developer assembly generally indicated by the reference numeral 15, and which provides development of the electrostatic image by means of multiple brushes 16 as the same moves through the development zone.

The developed electrostatic image is transported by the belt to a transfer station C whereat a sheet of copy paper is moved between a transfer roller and the belt at a speed in synchronism with the moving belt in order to accomplish transfer of the developed image solely by an electrical bias on the transfer roller. There is provided at this station a sheet transport mechanism generally indicated at 17 adapted to transport sheets of paper from a paper handling mechanism generally indicated by the reference numeral 18 to the developed image on the belt at the station C.

After the sheet is stripped from the belt 12, it is conveyed into a fuser assembly, generally indicated by the reference numeral 19, wherein the developed and transferred xerographic powder image on the sheet material is permanently affixed thereto. After fusing, the finished copy is discharged from the apparatus at a suitable point for collection externally of the apparatus.

Further details regarding the structure of the belt assembly 14 and its relationship with the machine and support therefor may be found in the copending application Ser. No. 102,312, assigned to the same assignee.

Referring now to FIG. 2, there is provided a manifold assembly, generally indicated as 30 positioned within an electrostatographic machine beneath a post-fusing transport assembly 32 and having a portion thereof, as more fully hereinafter discussed, extending towards the vicinity of the nip of a fuser assembly comprised of a fuser roller 34 and a pressure roller 36.

The manifold assembly includes a generally S-shaped body (FIG. 2) 38 suitably affixed to a coupling 40 by flange 42, such as by nuts 44. Referring to FIGS. 3 and 4, the body is generally T-shaped presenting an elongated leading section 46 including an orifice 48 to be placed in juxtaposition to the nip of the fuser assembly as hereinabove discussed. The coupling 40 is in fluid communication with the suction side of a fan 50 via line 52. The pressure side of the fan 50 is in fluid communication with the atmosphere.

As discussed in copending application Ser. No. 214,305, filed Dec. 30, 1971 entitled "Method and Apparatus for Fuser Assembly Cooling In An Electrostatographic Machine" and assigned to the Xerox Corporation, there is provided a heat transfer assembly for cooling portions of the pressure roller. Such assembly is activated in response to a signal that image receiving members of a dimension less than the maximum designed dimension therefor are being passed through the machine. While it is generally contemplated that the manifold assembly of the present invention is placed in operation in response to a signal that an image receiving member of the maximum designed dimension therefor is being processed, the manifold assembly may be operated continuously, or in response to an image reduction mode of the electrostatographic machine, as

discussed in the hereinabove mentioned application.

While the instant invention as to its objects and advantages has been described herein as carried in specific embodiments thereof, it is not desired to be limited thereby, but it is intended to cover the invention broadly within the scope the appended claims.

What is claimed is:

1. In an electrostatographic machine for making copies, said machine having a conductive fusing assembly with a fuser roller and a pressure roller, the combination of:

a plenum chamber provided with an outlet means and an elongated inlet means, said inlet means having a dimension of about that of a nip formed by contact of said rollers,

means positioning said plenum chamber with said elongated inlet means in operative relationship with the nip formed by contact of said rollers, and fan means for causing the gaseous medium surrounding the nip formed by contact of said rollers to be drawn therefrom into said plenum chamber and removed from said fusing assembly.

2. The electrostatographic machine as defined in claim 1 wherein said fan means is activated in response to a signal indicative of the passage of a receiving surface of the maximum length for such electrostatographic machine.

3. A method for removing the gaseous medium about the nip of a fuser assembly including a fuser roller and a pressure roller which comprises:

positioning an enclosure about said nip of said fuser assembly to form a zone, said zone having an elongated inlet and an outlet thereto, said elongated inlet having a dimension corresponding to that of said nip; and

withdrawing a gaseous medium from said outlet thereby causing the gaseous medium surrounding said nip to be passed through said zone, and venting said gaseous medium.

4. The process as defined in claim 3 wherein said gaseous medium is passed through said zone in response to a signal indicating a change in the operation of a machine employing said conductive fuser assembly.

5. The process as defined in claim 4 wherein said signal is produced by the use of an image receiving member of a designed maximum dimension therefor.

6. In a reproduction apparatus for producing copies of originals and incorporating fusing means to fuse images developed on said copies, said fusing means including a roller pair cooperating to form a nip through which said copies pass, at least one of said roller pair being heated, the improvement comprising:

manifold means having an elongated inlet slot disposed adjacent said fusing means nip to draw gaseous medium generated during fusing from the area of said fusing means nip, and

means for evacuating said manifold means whereby to draw off of said gaseous medium from said fusing means nip through said manifold means inlet slot.

7. The reproduction apparatus according to claim 6 including copy transport means adjacent the discharge side of said fusing means nip, said manifold means inlet slot being disposed between said fusing means discharge and said transport means.

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