United States Patent [19]

Sanza

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[54] **TRANSPORT ASSEMBLY**

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[52] **U.S. Cl.** **355/3,** 355/73

[51] **Int. Cl.** **G03g 15/00**

[58] **Field of Search** 355/3, 8, 10, 73

[56] **References Cited**

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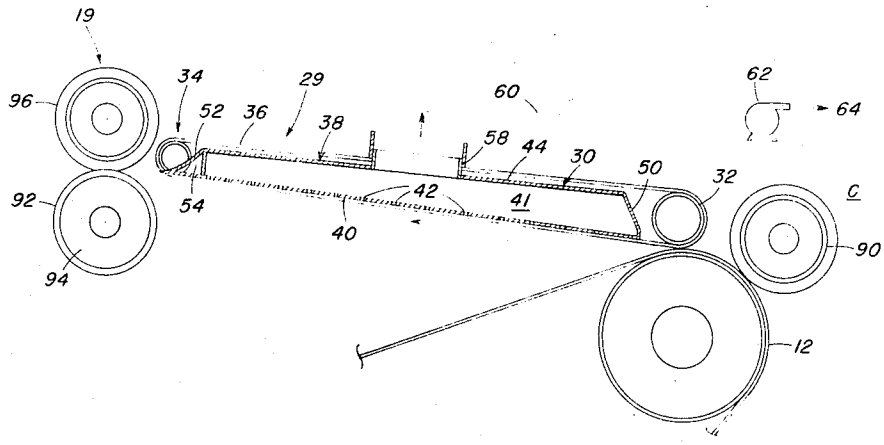
Primary Examiner—John M. Horan

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[57] **ABSTRACT**

A transport assembly for passing an image receiving member from a transfer station to a fuser assembly. The transport assembly is comprised of a belt assembly and a plenum chamber disposed within the belt assembly. An end section of the plenum chamber extends through one end of the belt assembly in juxtaposition to the nip of the fuser assembly to permit efficacious bridging of receiving members thereto.

5 Claims, 4 Drawing Figures



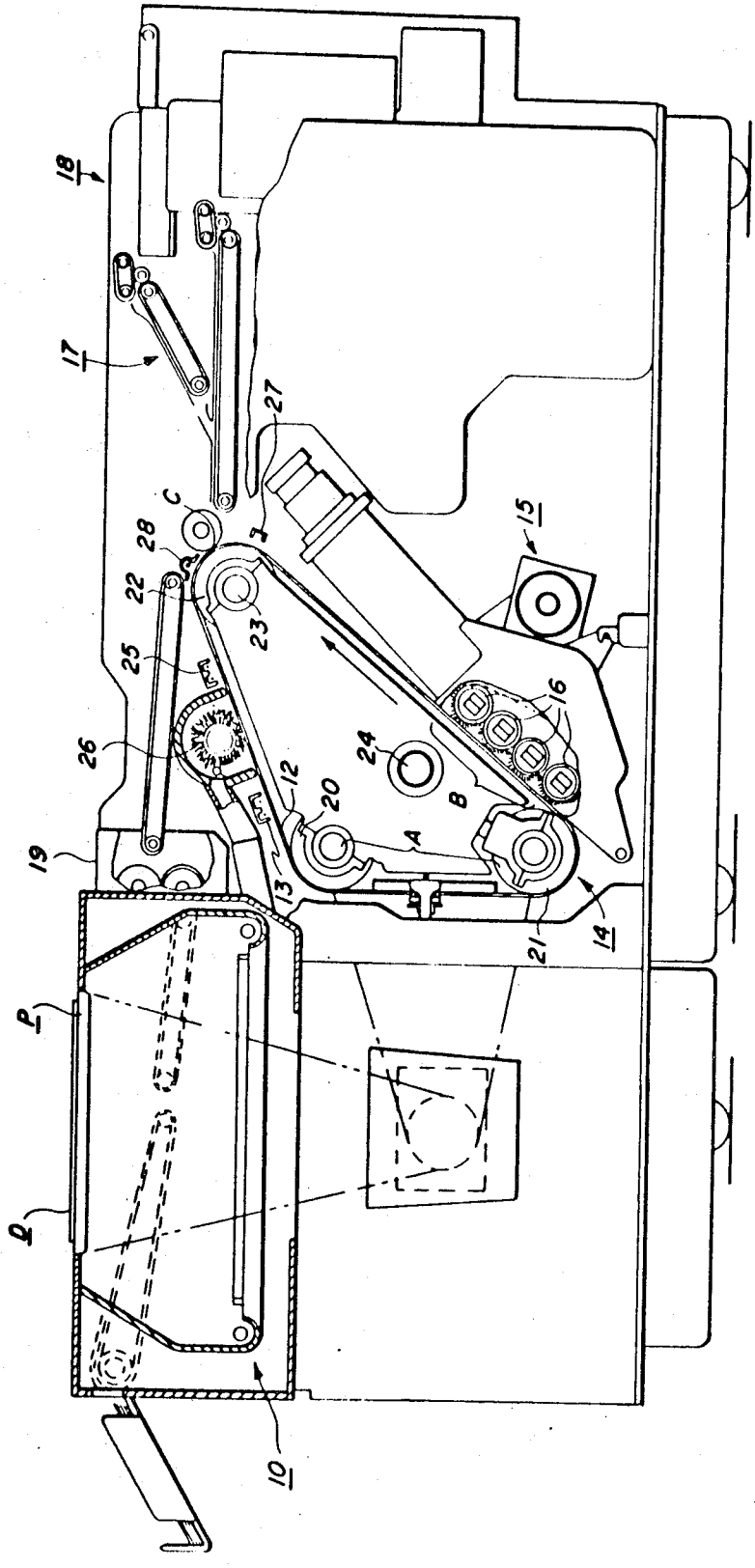


Fig. 1.

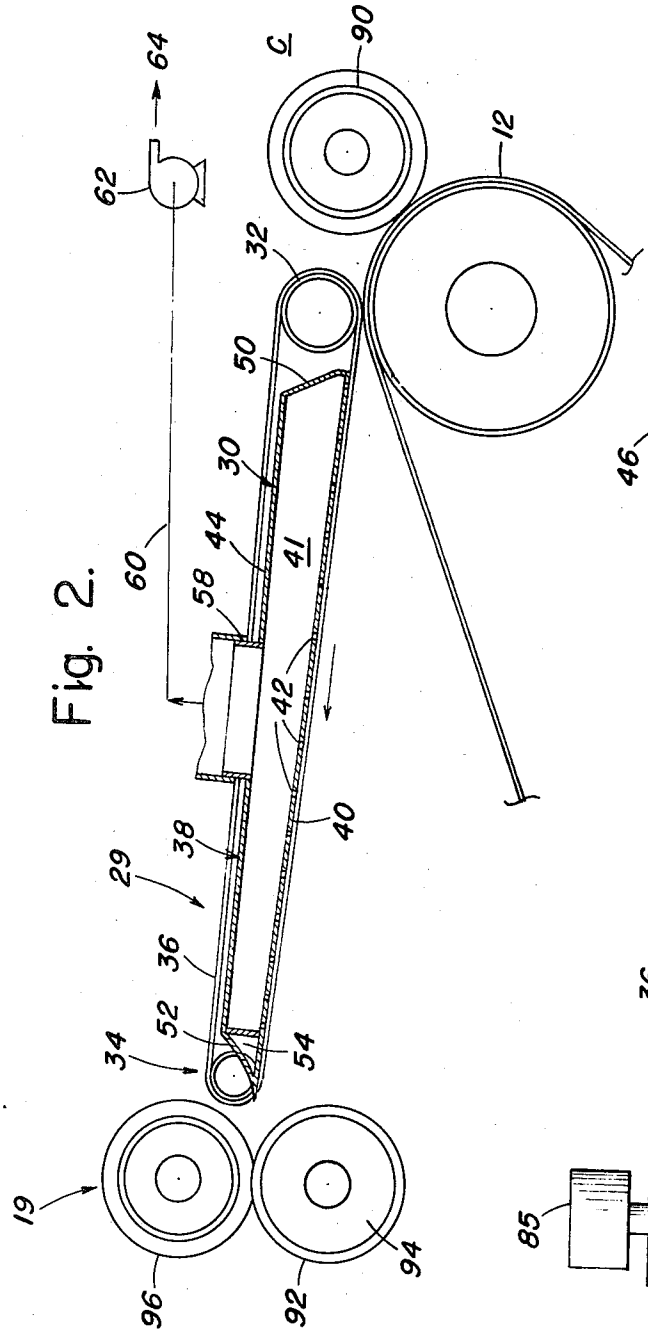


Fig. 2.

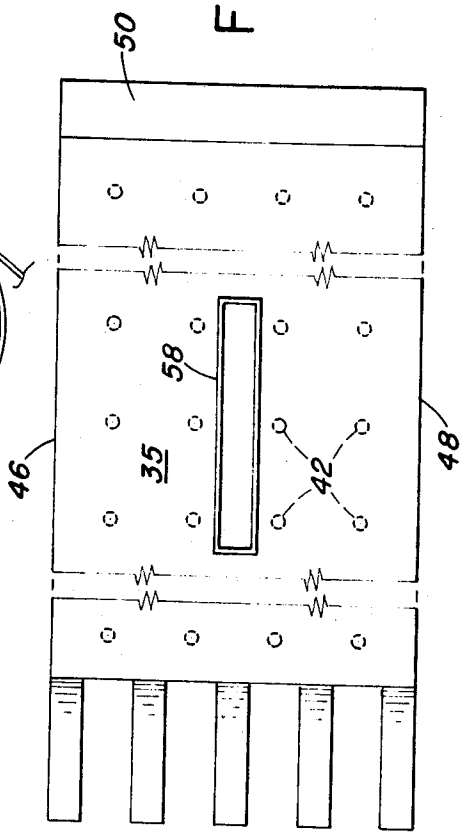


Fig. 4.

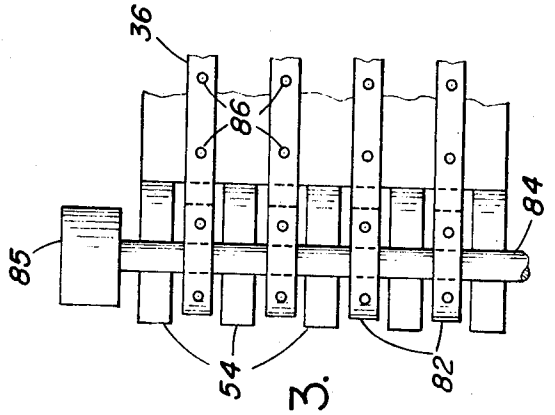


Fig. 3.

TRANSPORT ASSEMBLY

BACKGROUND OF THE INVENTION

This invention relates to electrostatography, and more particularly, to a method and apparatus for transporting an image receiving member from the transfer station to the fuser assembly of an electrostatographic machine.

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 reproduced 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 at which the toner particles coalesce or flow together and wet the paper surface to effect thereby a permanent bond. In order that any electrostatic machine may operate effectively, particularly high speed machines, it is necessary to introduce reliably a receiving member into a fuser assembly.

OBJECTS OF THE INVENTION

An object of this invention is to provide a novel fuser transfer assembly.

Another object of this invention is to provide a novel method and apparatus for transporting a receiving member into a fuser assembly operating at elevated temperatures.

A further object of this invention is to provide a novel method and apparatus for transporting a receiving member from the transfer station of an electrostatographic machine to the fuser assembly thereof.

SUMMARY OF THE INVENTION

These and other objects of the invention are obtained by providing a transport assembly including a belt assembly and a plenum chamber disposed therein. The plenum chamber is formed with an end section extending through the belt assembly in juxtaposition to the nip of the fuser assembly and provided with means for the efficacious bridging of receiving members.

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 an enlarged elevational view in cross-section of the transport assembly positioned between the transport station and the fuser assembly of such a reproduction machine, and includes a schematic flow diagram of the method of operation;

FIG. 3 is a partial plane view, greatly exaggerated of the end section of transport assembly adjacent the nip of the fuser assembly; and

FIG. 4 is a top plane view (greatly simplified) of the plenum chamber.

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 numeral **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 corotron **13.**

The belt is journaled for continuous 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.

The sheet is stripped from the belt **12** and conveyed by the transport assembly of this invention, generally indicated as **29**, 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**, the transport assembly **29** is comprised of a plenum assembly, generally indicated as **30**; a forward roller **32**; a rear roller assembly, generally indicated as **34**; and a plurality of endless belts **36**. The plenum assembly **30** is comprised of a molded top section, generally indicated as **38**, suitably affixed to a bottom section **40** having orifices **42** provided therein, to form a plenum zone **41**. The top section **38** includes a top wall **44**, side walls **46** and **48**, a front wall **50** and a rear wall configuration, generally indicated as **52**, comprised of finger-like sections **54**. The top wall **44** of section **38** is formed with a conduit **58** which is in fluid communication through line **60** with the suction side of a fan **62**, with the discharge side thereof being vented to the atmosphere through line **64**, as more fully hereinafter described. It is understood that a plurality of such conduits may be formed in the top wall **44** of section **38** as required for proper operation of the machine.

The rear roller assembly **34**, is comprised of a plurality of rollers **82**, positioned on and affixed to a shaft **84** suitably driven by a drive means, schematically illustrated as **85**. Each roller **82** mounted on the shaft **84** is disposed between sections **54** of the plenum assembly **30** in a manner such that the ends of the sections **54** may be placed in closed juxtaposition to the nip of a fuser assembly, as hereinafter more fully discussed. Each of the endless belts **36** is formed with open sections or orifices **86**. The configuration of the orifices **42** in the plenum assembly **30** corresponds to the areas over which the belts **34** course thereby placing the orifices **86** of the belts in intermittent fluid communication therewith. The transport assembly **29** as hereinabove mentioned is disposed in the machine (FIG. **1**) between the transfer station C and the fuser assembly **19**. The transfer station C includes a transfer roller **90** in contact with the photoconductive belt **12**. The fuser assembly **19** includes a fuser roller **92** suitably heated by an element **94** and in pressure contact with a roller **96**.

In operation, the rear roller assembly **34** is caused to rotate clockwise by drive means **85** to effect movement of the belts **36** as shown by the arrow. The conduit **58** of the plenum assembly **30** is placed in fluid communication with the fan **62** thereby lowering the pressure within the plenum zone **41** which results in a flow of the surrounding gaseous medium, such as air, through the orifices **42** into the plenum zone **41** to be vented via line **64** to the atmosphere. Upon passage of an image receiving member through the transfer station C, the image receiving member is held against the belts **36** by the air flow hereinabove described, and is caused to move to the fuser assembly by the movement of the belts **36**. The close positioning of the rear end section **52** of the transport assembly **29** to the nip of the fuser assembly **19** ensures repetitive and positive bridging of receiving members thereinto.

While the orifices **42** are described as being formed in the bottom section **40** in a configuration to correspond to the areas over which the belts **36** are positioned, other configurations are contemplated. It will be understood that the orifices **42** provided in the bottom section **40** will have a regular geometric configuration, e.g., evenly spaced along a line, etc. The number, spacing and size of the open sections **86** in the endless belts **36** are selected to achieve the desired result without sacrifice to belt integrity over extended periods of operation. Additionally, while it is contemplated that all belts are similarly formed, it is understood that one or more belts may be solid, and that the areas of the bottom section **40** over which any such belt would course may not be provided with orifices.

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 of the appended claims.

What is claimed is:

1. A transport assembly positioned within a machine for passing a flexible receiving member from a first station to a second station therein which comprises:

a receiving roller means disposed near said first station therein;

a rear roller means disposed near said second station and comprised of a plurality of rollers mounted on a shaft;

a plurality of endless belts positioned on said receiving and rear rollers means and forming an intermediate area therebetween;

a container positioned within said intermediate area extending between said rollers and forming a plenum zone, said container comprising:

an outlet conduit means;

a surface of a wall thereof in juxtaposition to one course of said endless belts, said wall being provided with a plurality of orifices; and

a plurality of sections at one end of said container extending between the rollers of said rear roller means;

a fan means in fluid communication with said conduit means; and

a drive means to effect rotation of said roller means to move said belt about said roller means.

2. The apparatus as defined in claim **1** wherein the endless belts are provided with open sections.

3. The apparatus as defined in claim **2** wherein the orifices provided in said wall are within the course of each of said belts.

4. The apparatus as defined in claim **1** wherein said drive means is associated with said rear roller means.

5. The apparatus as defined in claim **2** wherein said transport assembly is positioned between a transport station and a fuser assembly of an electrostatographic machine with said rear roller means being in juxtaposition to said fuser assembly and said wall is the bottom wall of said container.

* * * * *

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,743,403 Dated July 3, 1973

Inventor(s) Frank J. Sanza

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

In the drawings, Figure 4, change numeral "35" to -- 44 --.

Column 3, line 55, change "34" to -- 36 --.

Signed and sealed this 18th day of June 1974.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents

FORM PO-1050 (10-69)

USCOMM-DC 60376-P69
* U.S. GOVERNMENT PRINTING OFFICE : 1969 O—366-334.

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