United States Patent [19]

Bar-on

[11] **3,908,589**

[45] **Sept. 30, 1975**

[54] **STRUCTURE FOR APPLYING RELEASE AGENT TO A HEATED FUSER ROLL STRUCTURE**

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

[22] Filed: **June 24, 1974**

[21] Appl. No.: **482,729**

[52] **U.S. Cl.** **118/60;** 118/261; 118/637; 432/60

[51] **Int. Cl.²** **B05C 11/04**

[58] **Field of Search** 118/70, 60, 261, 104, 262, 118/264, 637; 432/60, 228; 101/425

[56] **References Cited**

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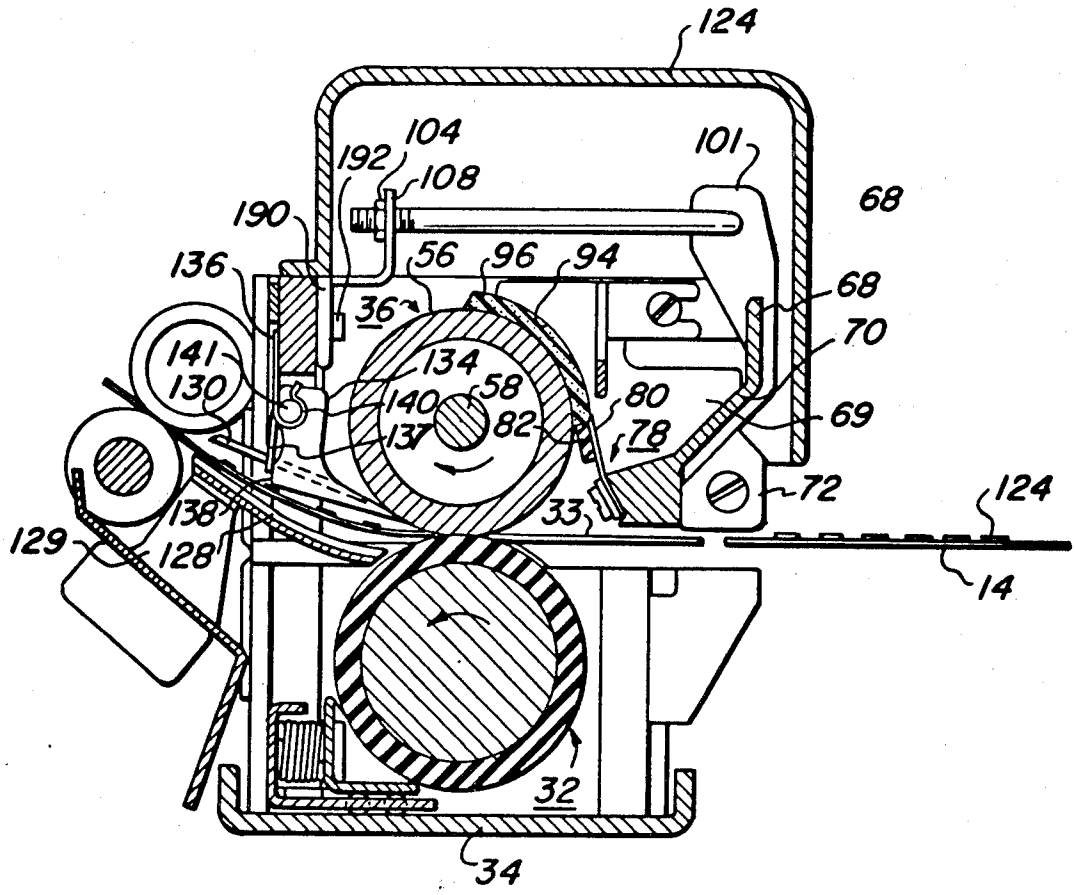
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Primary Examiner—Mervin Stein
Assistant Examiner—Douglas Salser

[57] **ABSTRACT**

A contact fuser structure and means for applying release material thereto. The fuser structure includes a bare metal surface to which is applied a thin layer of release material which prevents toner particles from contacting the metal surface. A sump containing the release material is provided for applying the release material to the metal surface. The sump is pivotally supported adjacent the metal surface such that a doctoring blade comprising the front wall of the sump contacts the fuser structure along the longitudinal axis thereof and the release material contained therein also contacts the fuser roll structure. Means are provided for adjusting the angular orientation of the sump to thereby vary the pressure exerted by the doctoring blade on the fuser roll structure.

14 Claims, 10 Drawing Figures



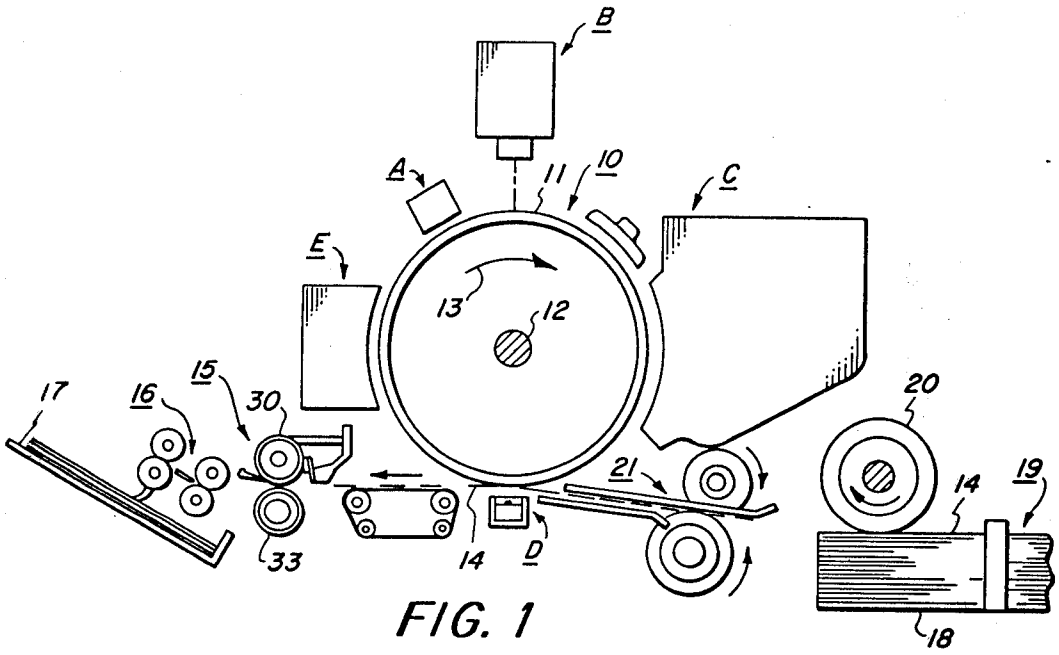

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FIG. 1

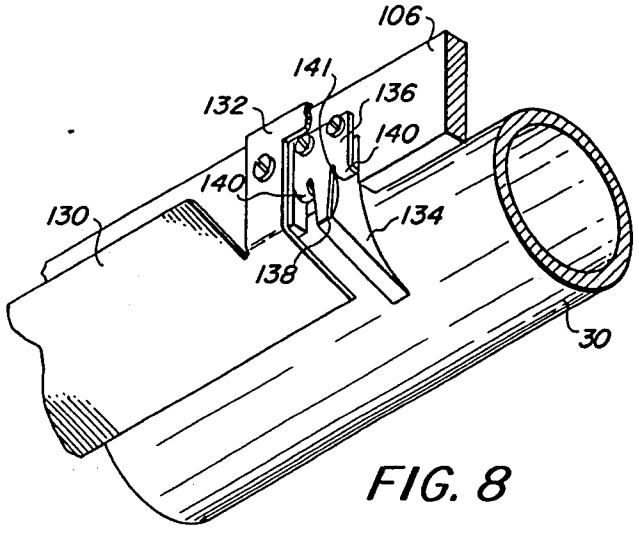

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FIG. 8

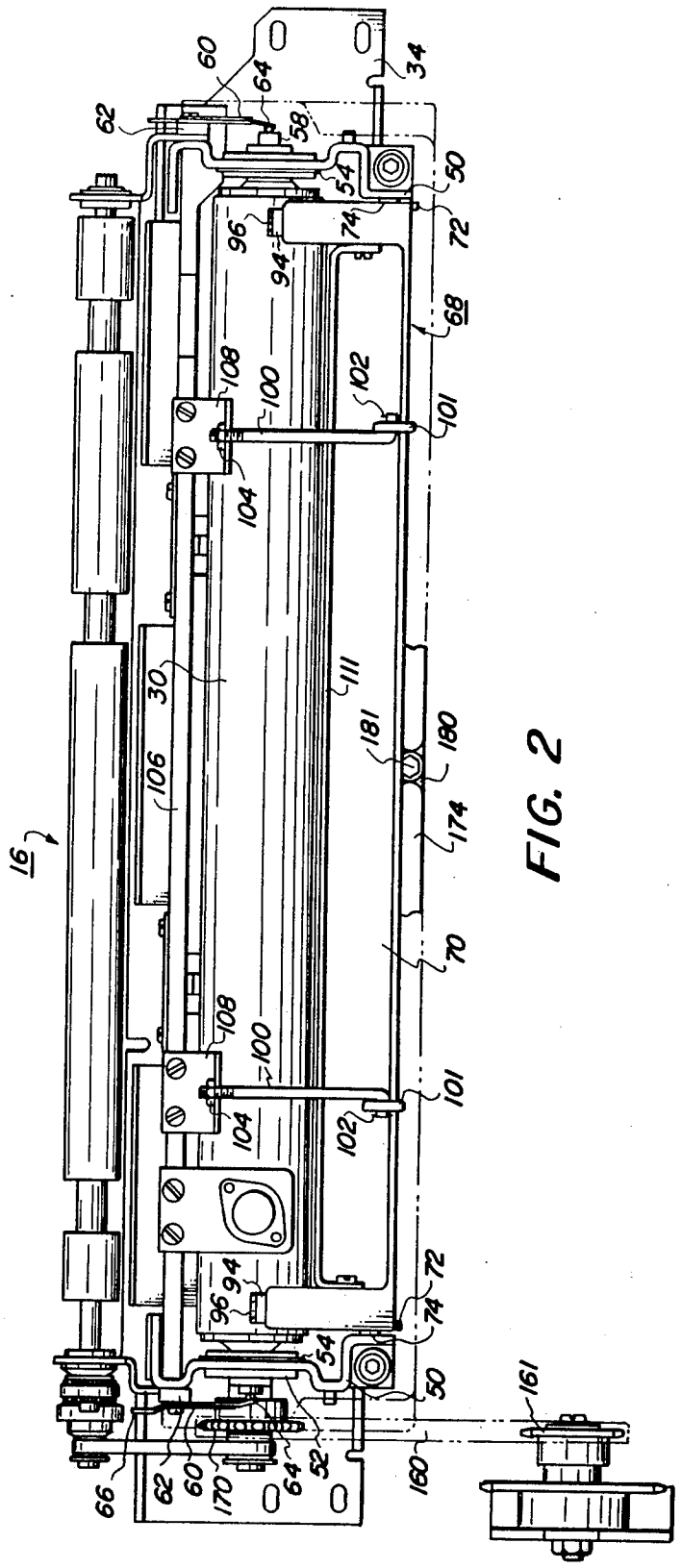

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FIG. 2

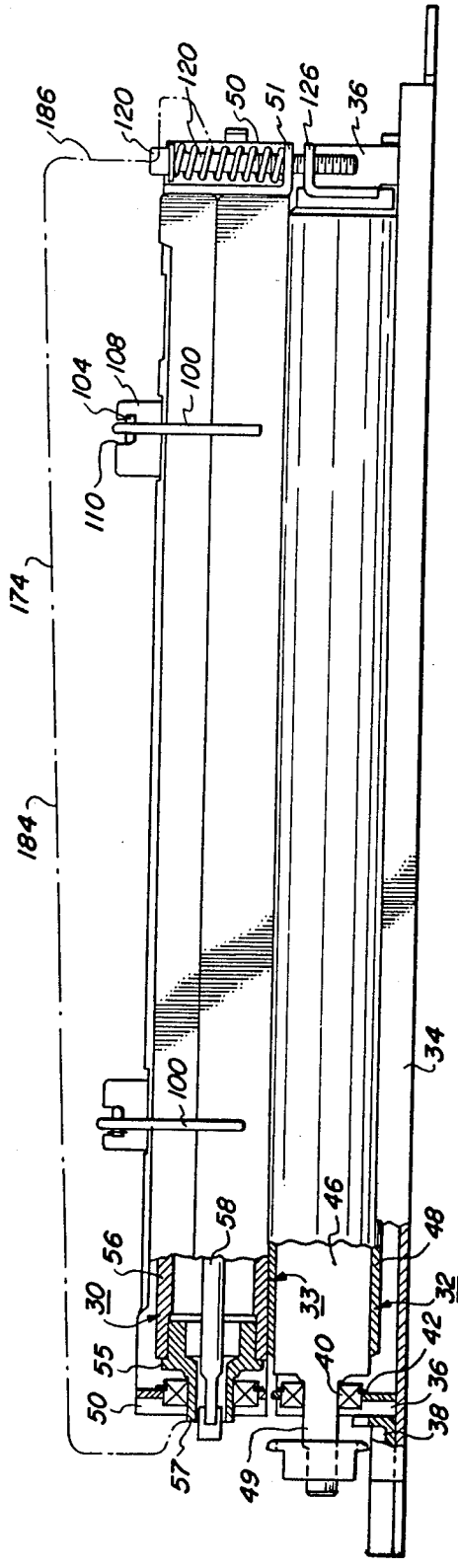

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FIG. 3

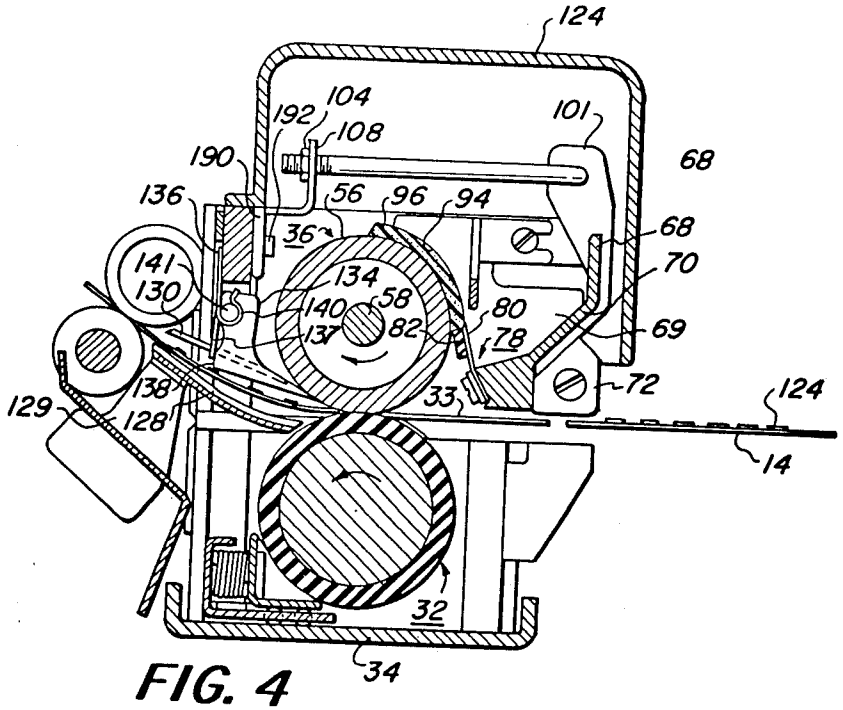


FIG. 4

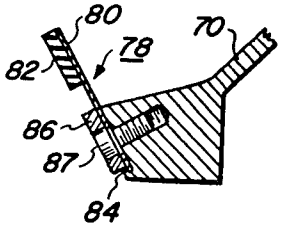


FIG. 5

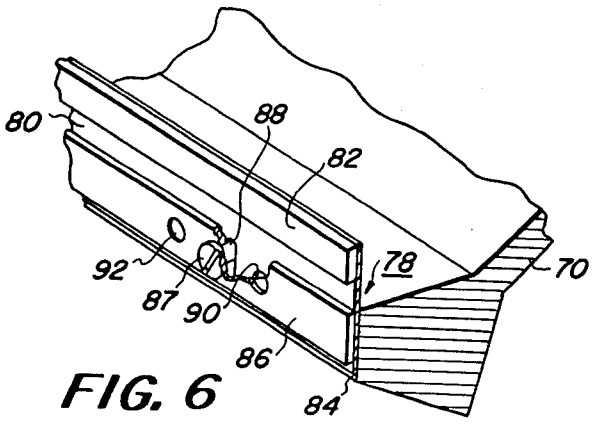


FIG. 6

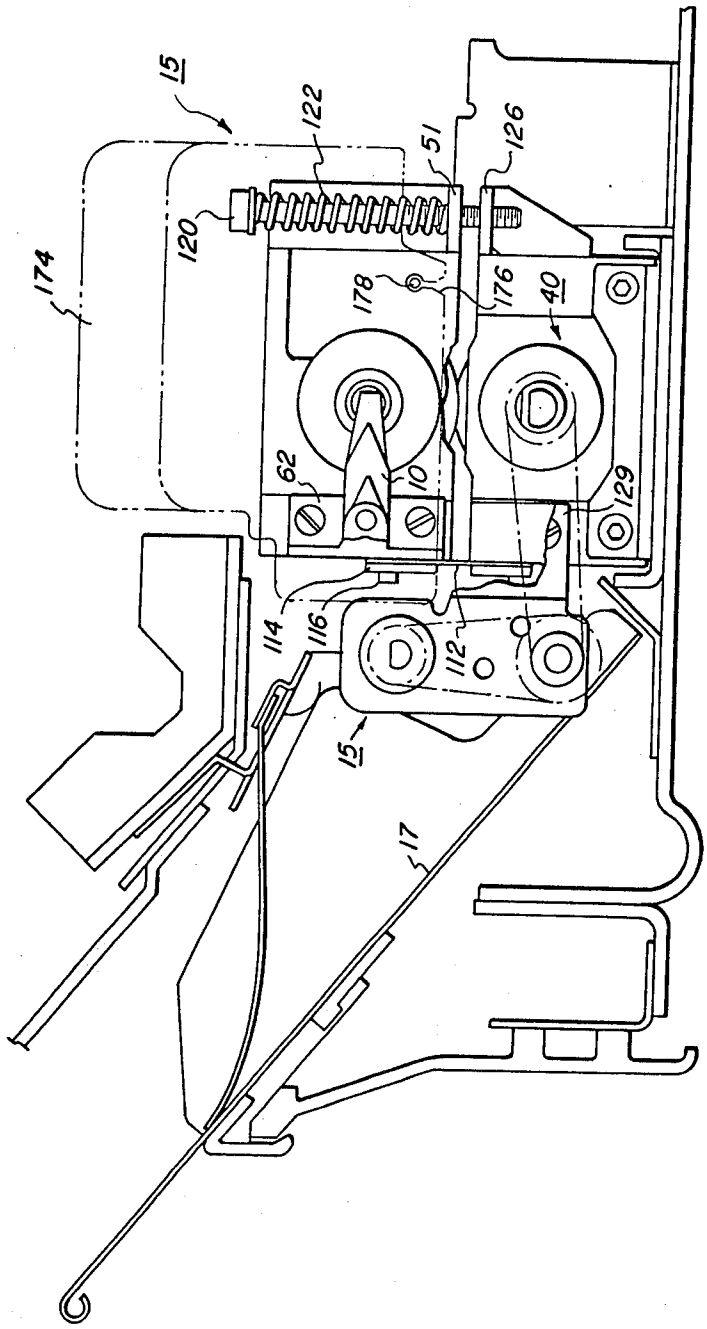


FIG. 7

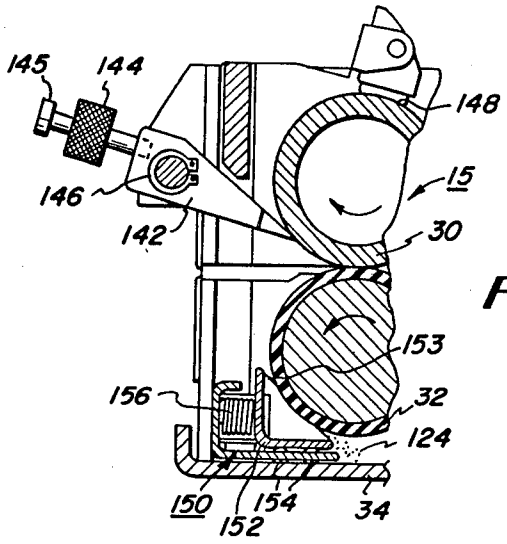

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FIG. 9

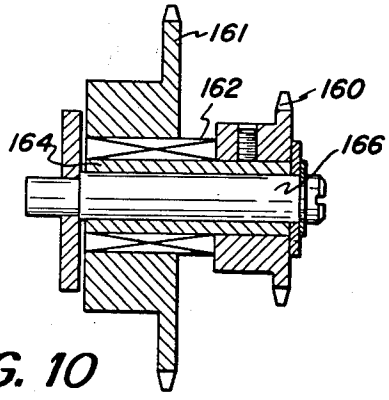

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FIG. 10

STRUCTURE FOR APPLYING RELEASE AGENT TO A HEATED FUSER ROLL STRUCTURE

BACKGROUND OF THE INVENTION

This invention relates generally to xerographic copying apparatus and, more particularly, to a contact fusing system for fixing electroscopic toner material to a support member.

In the process of xerography, a light image of an original to be copied is typically recorded in the form of a latent electrostatic image upon a photosensitive member with subsequent rendering of the latent image visible by the application of electroscopic marking particles, commonly referred to as toner. The visual image can be either fixed directly upon the photosensitive member or transferred from the member to a sheet of plain paper with subsequent affixing of the image thereto.

In order to permanently affix or fuse electroscopic toner material onto a support member by heat, it is necessary to elevate the temperature of the toner material to a point at which the constituents of the toner material coalesce and become tacky. This action causes the toner to be absorbed to some extent into the fibers of the support member which, in many instances, constitutes plain paper. Thereafter, as the toner material cools, solidification of the toner material occurs causing the toner material to be firmly bonded to the support member. In both the xerographic as well as the electrographic recording arts, the use of thermal energy for fixing toner images onto a support member is old and well known.

One approach to thermal fusing of electroscopic toner images onto a support has been to pass the support with the toner images thereon between a pair of opposed roller members, at least one of which is internally heated. During operation of a fusing system of this type, the support member to which the toner images are electrostatically adhered is moved through the nip formed between the rolls with the toner image contacting the fuser roll to thereby effect heating of the toner images within the nip. By controlling the heat transferred to the toner, virtually no offset of the toner particles from the copy sheet to the fuser roll is experienced under normal conditions. This is because the heat applied to the surface of the roller is insufficient to raise the temperature of the surface of the roller above the "hot offset" temperature of the toner whereat the toner particles in the image areas of the toner would liquify and cause a splitting action in the molten toner to thereby result in hot offset. Splitting occurs when the cohesive forces holding the viscous toner mass together is less than the adhesive forces tending to offset it to a contacting surface such as a fuser roll.

Occasionally, however, toner particles will be offset to the fuser roll by an insufficient application of heat to the surface thereof (i.e., "cold" offsetting); by imperfections in the properties of the surface of the roll; or by the toner particles insufficiently adhering to the copy sheet by the electrostatic forces which normally hold them there. In such a case, toner particles may be transferred to the surface of the fuser roll with subsequent transfer to the backup roll during periods of time when no copy paper is in the nip.

Moreover, toner particles can be picked up by the fuser and/or backup roll during fusing of duplex copies

or simply from the surroundings of the reproducing apparatus.

On arrangement for minimizing the foregoing problems, particularly that which is commonly referred to as "offsetting" has been to provide a fuser roll with an outer surface or covering of polytetrafluoroethylene, commonly known as Teflon to which a release agent such as silicone oil is applied, the thickness of the Teflon being on the order of several mils and the thickness of the oil being less than 1 micron. Silicone based oils, which possess a relatively low surface energy, have been found to be materials that are suitable for use in the heated fuser roll environment where Teflon constitutes the outer surface of the fuser roll. In practice, a thin layer of silicone oil is applied to the surface of the heated roll to thereby form an interface between the roll surface and the toner images carried on the support material. Thus a low surface energy layer is presented to the toner as it passes through the fuser nip and thereby prevents toner from offsetting to the fuser roll surface.

One arrangement for minimizing the foregoing problems, particularly that which is commonly referred to as offsetting, has been to provide a bare metal fuser roll to which is applied a thin coating of release material such as low molecular weight polyethylene. One such material which has been found to be particularly useful is solid at room temperature. Consequently, methods for applying conventional release agents which are liquid at room temperature have not been found suitable for release materials that are solid at room temperature.

Accordingly, the principal object of this invention is to provide a new and improved copier apparatus.

Another object of this invention is to provide a new and improved fuser for fixing toner images to support sheets.

Yet another object of this invention is to provide new and improved structure for applying release material to a metal fuser roll structure.

BRIEF SUMMARY OF THE INVENTION

Briefly, the above-cited objects of this invention are accomplished by the provision of a heated fuser roll system and structure for applying release material to the fuser roll structure for preventing contacting of the fuser roll structure by toner particles. The fuser roll system which is utilized in a xerographic copier apparatus for fusing toner images to support sheets comprises a bare metal roll or core to which a low molecular weight polyethylene is applied.

A sump for containing the polyethylene which is solid at room temperature is pivotally mounted adjacent the fuser roll structure such that the polyethylene is contacted by the fuser roll structure, the heat therefrom liquifying the normally solid polyethylene.

The front wall of the sump comprises a composite doctoring blade comprisig a base member having an elastomeric strip affixed thereto and engaging the metal core along the length thereof to act both as a seal for preventing the liquid polyethylene from leaking out of the sump and for also doctoring the polyethylene to a desired thickness on the metal core. A seal comprising a closed cell silicone sponge rubber engages the base member to act as a seal to prevent release agent leakage. The aforementioned strip is preferably fabricated from a closed cell silicone sponge rubber.

A pair of rod-shaped members threaded at the end thereof are attached to a rear wall of the sump remote from the pivotal supports. Nuts carried by the threaded ends engage cooperating flange members. Turning of the nuts affects rotation of the sump and therefore, the doctoring blade about the aforementioned pivotal supports to vary the pressure exerted by the doctoring blade on the fuser roll structure in order to control the amount of polyethylene applied to the fuser roll.

It will be appreciated that materials other than the polyethylene can be applied by the system described. For example, low viscosity silicone oils which are conventional in this environment could be used.

Other objects and advantages of the present invention will become apparent when read in conjunction with the accompanying drawings wherein:

FIG. 1 is a schematic representation of a xerographic reproducing apparatus incorporating the novel image fuser of the present invention;

FIG. 2 is a top plan view of a fuser assembly incorporated in FIG. 1;

FIG. 3 is a right side elevational view of the fuser assembly of FIG. 2;

FIG. 4 is a cross-sectional view taken on the line IV—IV of FIG. 3;

FIG. 5 is an enlarged fragmentary view in section of a release agent doctoring structure forming a part of the fuser assembly of FIG. 2 through 4;

FIG. 6 is a perspective view of the composite doctoring structure of FIG. 5;

FIG. 7 is an elevational view of the fuser assembly as viewed from the left in FIG. 3;

FIG. 8 is a perspective view of a copy sheet stripper finger;

FIG. 9 is a cross-sectional view of a fuser roll system showing a modified stripper finger arrangement and a backup roll cleaning structure;

FIG. 10 is a cross-sectional view of a sprocket drive and one-way clutch arrangement incorporated in the fuser assembly.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

The reproducing machine illustrated in FIG. 1 employs an image recording drum-like member **10** the outer periphery of which is coated with a suitable photoconductive material **11.** One type of photoconductive material is disclosed in U.S. Pat. No. 2,970,906 issued to Bixby in 1961. The drum **10** is suitably journaled for rotation within a machine frame (not shown) by means of a shaft **12** and rotates in the direction indicated by arrow **13,** to bring the image retaining surface thereon past a plurality of xerographic processing stations. Suitable drive means (not shown) are provided to power and coordinate the motion of the various cooperating machine components whereby a faithful reproduction of the original input scene information is recorded upon a sheet of final support material such as paper or the like.

Since the practice of xerography is well known in the art, the various processing stations for producing a copy of an original are herein represented in FIG. 1 as blocks A to E. Initially, the drum moves photoconductive surface **11** through a charging station A. At charging station A an electrostatic charge is placed uniformly over the photoconductive surface **11** of the drum **10** preparatory to imaging. The charging may be provided by a corona generating device of a type described in U.S. Pat. No. 2,836,725 issued to Vyverberg in 1958.

Thereafter, the drum **10** is rotated to exposure station B where the charged photoconductive surface **11** is exposed to a light image of the original input scene information, whereby the charge is selectively dissipated in the light exposed regions to record the original input scene in the form of a latent electrostatic image. A suitable exposure system may be of the type described in U.S. Pat. application, Ser. No. 259,181 filed June 2, 1972.

After exposure, drum **10** rotates the electrostatic latent image recorded on the photoconductive surface **11** to development station C, wherein a conventional developer mix is applied to the photoconductive surface **11** of the drum **10** rendering the latent image visible. A suitable development station is disclosed in U.S. Pat. Application, Ser. No. 199,481 filed Nov. 17, 1971. This application describes a magnetic brush development system utilizing a magnetizable developer mix having carrier granules and toner comprising electrophotographic resin plus colorant from dyes or pigments. A developer mix is continually brought through a directional flux field to form a brush thereof. The electrostatic latent image recorded on photoconductive surface **11** is developed by bringing the brush of developer mix into contact therewith. The developed image on the photoconductive surface **11** is then brought into contact with a sheet of final support material **14** within a transfer station D and the toner image is transferred from the photoconductive surface **11** to the contacting side of the final support sheet **14.** The final support material may be plain paper, gummed labels, transparencies such as Polycarbonate, Polysulfane and Mylar, etc., as desired.

After the toner image has been transferred to the sheet of final support material **14,** the sheet with the image thereon is advanced to a suitable fuser assembly **15** which fuses the transfer powder image thereto. After the fusing process, the final support material **14** is advanced by a series of rolls **16** to a copy paper tray **17** for subsequent removal therefrom by a machine operator.

Although a preponderence of the toner powder is transferred to the final support material **14,** invariably some residual toner remains on the photoconductive surface **11** after the transfer of the toner power image to the final support material **14.** The residual toner particles remaining on the photoconductive surface **11** after the transfer operation are removed from the drum **10** as it moves through cleaning station E. Here the residual toner particles are first brought under the influence of a cleaning corona generating device (not shown) adapted to neutralize the electrostatic charge remaining on the toner particles. The neutralized toner particles are then mechanically cleaned from the photoconductive surface **11** by conventional means as for example, the use of a resiliently biased knife blade as set forth in U.S. Pat. No. 3,660,863 issued to Gerbasi in 1972.

The sheets of final support material **14** processed in the automatic xerographic reproducing device may be stored in the machine within a removable paper cassette **18.** A suitable paper cassette is set forth in U.S. Pat. application, Ser. No. 208,138 filed Dec. 15, 1971.

The copier can also have the capability of accepting and processing copying sheets of varying lengths. The

length of the copy sheet, of course, being dictated by the size of the original input scene information recorded on the photoconductive surface **11.** To this end, the paper cassette **18** is preferably provided with an adjustable feature whereby sheets of varying length and width can be conveniently accommodated therein.

In operation, the cassette **18** is filled with the stack of final support material **19** of pre-selected size and the cassette **18** is inserted into the machine by sliding along a baseplate (not shown) which guides the cassette **18** into operable relationship with a pair of feed rollers **20.** When properly positioned in communication with the feed rollers **20** the top sheet of the stack **19** is separated and forwarded from the stack **19** into the transfer station D by means of registration rollers **21.**

It is believed that the foregoing description is sufficient for purposes of present application to illustrate the general operation of an automatic xerographic copier which can embody the teachings of the present invention.

The fuser assembly **15** as best illustrated in FIGS. **2** through **4** comprises a heated fuser roll structure **30** and a backup roll **32** which cooperate to form a nip **33** therebetween through which copy paper having toner images thereon passes with the toner images contacting the fuser roll structure **30.**

A channel shaped support base **34** (FIG. **3**) is provided for supporting the fuser assembly **15** in the copier apparatus. The backup roll **30** is supported by a pair of support brackets **36** which are secured to the support base **34** by means of right angle brackets **38,** the bases of which are spot welded or otherwise suitably affixed to the suport base **34.** A pair of ball bearings **40** are supported by the brackets **36** and are captivated in the brackets by means of retaining rings **42.** The backup roll structure may comprise any suitable construction, for example, a steel cylinder, but preferably comprises a rigid steel core or shaft **46** having a Viton elastomer surface or layer **48** disposed thereover and affixed thereto. A pair of shaft ends **49** of the core or shaft **46** are received in the bearings **40** for suspporting the backup roll **30.** A suitable backup roll has an overall dimension of approximately 1.55 inches including a 0.1 inch cover or layer of Viton elastomer or other suitable high temperature elastomeric material, for example, fluorosilicone or silicone rubber. The specific dimensions of the backup roll will be dictated by the requirements of the particular copying apparatus wherein the fuser assembly **15** is employed, the dimensions being greater or less depending upon the process speed of the machine. In this embodiment the length of the roll is approximately 15½ inches to accomodate various paper sizes.

A pair of support brackets **50** (FIG. **2**) having a generally E-shaped configuration similar to the support brackets **36** are provided for mounting the fuser roll structure in the fuser assembly **15.** To this end, a pair of ball bearings **52** one in each of the support brackets **50** are provided, the bearings being retained in the brackets by means of retaining rings **54.** A pair of end caps **55** are secured to a hollow cylinder or core **56** (FIGS. **3** and **4**) forming a part of the fuser roll structure **30** and reduced portions **57** thereof are received in the bearings **52** for supporting the fuser roll structure. A heating element **58** is supported internally of the core **56** for providing thermal energy to elevate the temperature of the core to operating limits. The heating element may comprise any suitable type heater for elevating the surface temperature of the cylinder to operational temperatures, therefore 285°–290°F. For example, it may be a quartz envelope having a tungsten resistance heating element disposed therein. The cylinder or core **56** is fabricated from any suitable material capable of efficiently conducting the heat to the external surface of the core. Typical materials are anodized aluminum and alloys thereof, steel, stainless steel, nickel and alloys thereof, nickel plated copper, chrome plated copper, copper and alloys thereof. The resulting structure has an outside diameter on the order of 1.5 inches and has a length equal to that of the backup roll. The power requirements for the foregoing are 420 watts peak power with an average power of 320 watts and 100 watts for standby.

The heater element **58** is supported internally of the core **56** by a pair of spring supports **60** which are mounted by insulator blocks **62** to the support brackets **50.** The free ends of the springs supporting the heater element are each provided with a locating ball **64** while the opposite end of the spring is disposed in contact with an electrical terminal **66** to which electrical wire (not shown) may be attached for supplying electrical energy to the heater element. The terminal blocks can be secured to the support brackets in any suitable manner, for example, by screws. The springs supports and terminals are preferably rivoted to the terminal block.

The aforementioned materials from which the core **56** of the fuser roll structure may be fabricated are relatively high surface energy materials, consequently, hot toner material contacting such surfaces would readily wet the surface of the fuser roll and it would be difficult to remove the toner therefrom. Accordingly, there is provided a sump **68** (FIGS. **2** and **4**) for containing a material **69** capable of interacting with the core in a manner described in U.S. Pat. application, Ser. NO. 383,231 filed July 27, 1973 in the name of Moser, et al. and assigned to the same assignee as the instant application. The material is preferably a low molecular weight substance which is solid at room temperature and which has a relatively low viscosity at the operating temperatures of the fuser roll structure. An example of such a material is polyethylene homopolymer manufactured by Allied Chemical Co. and having the designation AC–8 hopolymer.

The sump **68** comprises a rear wall **70** having a generally sloping portion connected to a generally vertical portion. The rear wall is provided with a pair of apertured flanges **72** for receiving supports **74** for mounting the sump **68** to the flanges **51** secured to the brackets **50** in a manner to allow pivotal movement thereof. The sump also comprises a front wall (FIG. **5**) which comprises a composite doctoring blade **78** including a base member **80** with an elongated strip **82** secured to the base member. The strip **82** is fabricated from a high temperature elastomeric material which is compatible with the particular material **69,** for example, silicone rubber or Viton. By compatible with the strip it is meant that the dimensions of the strip are not altered by contact with the material.

The base member **80** and therefore the blade **78** is supported by the rear wall **70** by means of a rubber seal attached to a lip **84** forming a part of the rear wall and a retainer **86** which is suitably secured by, for example, screws **87,** to the rear wall **70.** The base member **80** is provided with a plurality of slots **88** in which the screws

87 ride to allow mounting of the base member intermediate the retainer **86** and the rear wall **70.** The base member is also provided with a plurality of apertures **90** disposed on the sides of the slots **88.** The apertures receive dimples **92** forming a part of the retainer **86.** The slots and the apertures are oversized with respect to the dimples and screws so that the base member can move due to thermal expansion without buckling thereof. It will be appreciated that in addition to serving as a metering blade the composite structure **78** serves to clean toner from the fuser roll structure **30** and also act as a seal to prevent the liquid or low viscosity polyethylene from leaking out of the sump **68.** A pair of arcuate recesses **94** provided in the rear wall **70** have disposed therein end seals **96** which contact the fuser roll structure and thereby cooperate with the strip **82** to prevent leakage of polyethylene from the sump.

A pair of links **100** attached to extensions **101** of the rear wall by retaining pins **102** have their ends threaded for receiving nuts **104.** A tie bar **106** attached to the support brackets **50** support L-shaped brackets **108** having slots **110** therein. The links **100** are received in the slots **110** to thereby provide means for adjusting the pivotal orientation of the sump **68** to thereby increase or decrease the pressure of the composite doctoring structure **78** on the fuser roll structure to thereby control in accordance with a predetermined amount, for example, a layer less than 1 micron thick, the application of polyethylene to the fuser roll structure. This is accomplished by tightening or loosening of the nuts **104.**

As mentioned hereinbefore, the polyethylene is solid at room temperature and is liquid at operational temperatures. The polyethylene is solid form is placed in the sump and is heated by the thermal energy of the fusing roll structure and thereby liquified. When the polyethylene resolidifies after the machine has been inoperative for a period of time the polyethylene tends to move away from the fuser roll structure consequently when the machine is restarted the polyethylene may not be applied to the fuser roll structure immediately. This means that the fuser roll structure may not be properly protected against toner offsetting to the bare metal. In order to safeguard against the foregoing, the surface of the rear wall contacting the polyethylene is coated with a material that has a low affinity for the polyethylene, for example, silicone rubber. In order to insure that the polyethylene is in contact with the fuser roll structure at the time of restarting the machine, a collecting bar **111** is provided in the sump and attached thereto such that it is positioned adjacent the fuser roll structure. Accordingly, when the polyethylene resolidifies it will pull away from the rear wall **70** and it will solidify on the collecting bar such that it is still in contact with the fuser roll structure. This arrangement will insure proper operation of the fuser assembly until the bulk of the polyethylene is melted in the sump.

The axis of the backup roll which should be apparent from a consideration of its mounting as discussed above is fixed relative to the support base **34.** However, the fuser roll structure is mounted such that its pressure engagement with the backup roll can be adjusted to thereby enable variation of the length of the nip **33** formed between the two roll structures. To this end, the fuser roll support brackets **50** are mounted to the backup roll support brackets **36** by a pair of flexures **112** which are secured to the support brackets **36** and **50** by means of retaining plates **114,** dowl pins **116** and caps screws **118.** The flexures **112** are preferably fabricated from spring steel having a relatively small thickness but sufficiently sturdy to hingedly mount the fuser roll support brackets to the backup roll support brackets. A force at the nip on the order of 150 pounds is provided by means of socket head screws **120** and commercial compression springs **122** which are supported by the upper flanges **51** secured to the fuser roll support brackets **50.** The screws **120** are received in threaded lower flanges **126** which are fixedly mounted to the backup roll support brackets **36.** It will be appreciated that by adjusting the socket head screws **120** against the force exerted by the spring **122,** the nip pressure can be varied to produce the desired nip pressure.

The copy paper **14** carrying the fused images comprising toner **124** is moved through a lower guide plate **128** (FIG. 4) which is supported by mounting brackets **129** attached to the backup roll supporting brackets **36** and an upper guide plate **130** attached to the tie bar **106.** The upper guide plate is mounted to the tie bar by means of a generally U-shaped flange **132** having an open area which is integral with the plate **130** and disposed at an acute angle relative thereto. To insure that the copy paper follows along a predetermined path including the space between the lower and upper guide plates a plurality of generally L-shaped stripper fingers **134** (FIGS. 4 and 8), preferably two in number, are provided. The leading edges of the stripper fingers are biased into engagement with the fuser roll structure **30** by means of a pair of combination mounting brackets and bias member **136** in the form of leaf springs. The leaf springs are mounted to the tie bar **106** such that a cantilevered portion **137** thereof engages a cam surface **138** of the stripper finger **134.** Portions of the mounting bracket **136** are rolled as indicated at **140** to provide a bearing surface for shafts **141** carried by the stripper fingers **134.**

An alternate form of stripper finger may be employed which comprises stripper fingers **142** (FIG. 9) supported on a shaft **143** which is supported indirectly by the support brackets **50** of the fuser roll structure **30.** A counterweight **144** is provided for each of the stripper fingers **142** and is secured thereto by means of a cap screw **145** which is threaded into the stripper finger. The position of the counterweight can be varied relative to the stripper finger to increase or decreases the amount of pressure which is applied by the stripper finger to the fuser roll structure. The position of the stripper fingers **142** are maintained on the shaft in a position relative to the longitudinal axis of the fuser roll structure **30** by grip rings **146.** The grip rings while maintaining the position of the stripper fingers fixed relative the fusing roll structure **30** allow movement relative to the aforementioned axis of the stripper fingers with respect to the fuser roll structure so that the fuser stripper fingers can be repositioned in the event of wear of the fuser roll structure.

The surface temperature of the fuser roll structure **30** is controlled by contacting the surface thereof with a thermistor probe **148** of the type described in U.S. Pat. No. 3,327,096, issued in 1967 to Bernous and incorporated herein by reference.

During operation of the fuser assembly **15,** particularly during duplex copying, toner accumulates on the backup roll structure **32.** Accordingly, a backup roll

cleaning structure or assembly **150** is provided which comprises a triangular shaped support member **152** having a wiper member **153** carried thereby. The cleaning assembly is supported for movement in the direction of the backup roll structure by a plurality of roller supports **154** and a spring member **156** supported by a member **158** urges the wiper surface into wiping contact with the backup roll. As can be seen from the drawings, the cleaning assembly is disposed adjacent the support base **34** so that toner removed from the backup roll will be deposited onto the support base. In operation it has been found that the toner accumulates on the exit side of the nip formed between the backup roll and the wiper member. The wiper member is preferably a high temperature material with a high degree of resiliency and low affinity for toner particles and preferably comprises tetrafluoroethylene, commonly referred to as TFE.

In order to accomplish rotational movement of the fuser and backup rolls, the main machine drive is coupled to the fuser roll structure via a drive sprocket **160**, which is coupled to a driven sprocket **161** by means of a one-way clutch **162**, a bushing **164**, and stub shaft **166**. The driven sprocket **161** is coupled to a sprocket **170** carried by the shaaft of the fuser roll structure **30** via a chain **172**. The clutch **162** serves as a coupling between the input from the maain machine drive and the fuser roll structure, which allows the fuser roll structure and backup roll to be rotated independently of the sprockets provided for power driving the fuser roll structure. In the event that a machine jam occurs, a sheet of copy paper which has started through the nip of the fuser assembly **15** can be manufally moved out of the fuser assembly while simultaneously fusing the toner images to the copy paper. Accordingly, unlike prior art fuser structures utilized in the xerographic process, a copy which has started through the fuser but has not been completely fused can be saved because it can be fused notwithstanding a paper jam.

A cover structure **174** protects the fuser assembly from contaminates. As viewed in FIG. **7**, the cover structure has a bifurcated flange portion **176** which receives a pin member **178** carried by the bracket **50**. There are two such flanges and pin members, one on each side of the fuser assembly. A sidewardly projecting flange **180** has an aperture through which a screw **181** is inserted and received in a threaded aperture in a flange **182** forming a part of the sump **68**. The combination bifurcated flanges and pin members together with the screw **181** secures the cover in place. As viewed in FIG. **3**, the cover has an inclined top surface **184** and an opening **186** at the extreme right end thereof for directing vapors out of the fuser assembly. A pair of depending flanges **190** cooperate with pins **192** carried by the tie bar **106** to assist in maintaining the cover in place.

While the invention has been described with respect to a preferred embodiment, it will be apparent that certain modifications and changes can be made without departing from the spirit and scope of the invention, for example, the images to be fused can be formed by other than the xerographic process disclosed and it is therefore intended that the foregoing disclosure be limited only by the claims appended hereto.

What is claimed is:

1. Contact fuser structure for fixing toner images to support sheets comprising:

a heated fuser roll structure;

a resilient backup roll structure forming a nip with said heated fuser roll structure through which said support sheets move with said toner images facing said fuser roll structure;

means for applying release material to the surface of said fuser roll structure, said release material applying means comprising:

a sump including a doctoring blade structure forming one wall thereof;

means mounting said sump for pivotal movement relative to said fuser roll structure, said doctoring blade engaging said fuser roll structure substantially coextensive with the longitudinal axis thereof and the fuser roll structure being positioned to rotate in contact with the release material contained in the sump; and

means for adjusting the angular position of said sump to thereby vary the force exerted by said doctoring blade on said fuser roll structure.

2. A structure according to claim **1**, wherein said doctoring blade structure comprises a composite arrangement including an elastomeric strip attached to a base member, the latter being attached to an opposite wall of said sump.

3. A structure according to claim **2**, including resilient end seals disposed in said opposite wall and cooperating with said resilient strip to prevent leakage of said release material from said sump.

4. A structure according to claim **3**, wherein said means for adjusting the angular position of said sump comprises a pair of links attached to said sump at locations adapted to effect rotation of the sump when forces are exerted along the axis of said links.

5. A structure according to claim **4**, wherein said links comprise threaded rods having nuts received thereon which engage flanges remotely disposed relative to said points of attachment of said links to said sump, said engagement of said flanges by said nuts being effective to tighten or loosen said nuts to vary the force exerted by said doctoring blade structure on the said fuser roll structure.

6. Means for forming toner images on support sheets comprising:

a heated fuser roll structure;

a resilient backup roll structure forming a nip with said heated fuser roll structure through which said support sheets move with said toner images facing said fuser roll structure;

means for applying release material to the surface of said fuser roll structure, said release material applying means comprising:

a sump including a doctoring blade structure forming one wall thereof;

means mounting said sump for pivotal movement relative to said fuser roll structure, siad doctoring blade engaging said fuser roll structure substantially coextensive with the longitudinal axis thereof and the fuser roll structure being positioned to rotate in contact with the release material contained in the sump; and

means for adjusting the angular position of said sump to thereby vary the force exerted by said doctoring blade on said fuser roll structure.

7. Structure according to claim **6**, wherein said doctoring blade structure comprises a composite arrangement including a resilient strip attached to a base mem-

ber, the latter being attached to an opposite wall of said sump.

8. Structure according to claim **7,** including resilient end seals disposed in said opposite wall and cooperating with said resilient strip to prevent leakage of said release material from said sump.

9. Structure according to claim **8,** wherein said means for adjusting the angular position of said sump comprises a pair of links attached to said sump at locations adapted to effect rotation of the sump when forces are exerted along the axis of said links.

10. Structure according to claim **9,** wherein said links comprise threaded rods having nuts received thereon which engage flanges remotely disposed relative to said points of attachment of said links to said sump, said engagement of said flanges by said nuts being effective to tighten or loosen said nuts to vary the force exerted by said doctoring blade structure on the said fuser roll structure.

11. Structure according to claim **1,** wherein said doctoring blade continuously engages said fuser roll structure at least during operation of said contact fuser structure.

12. Structure according to claim **6,** wherein said doctoring blade continuously engages said fuser roll structure at least during operation of said means for forming toner images.

13. Structure according to claim **1,** wherein said doctoring blade comprises a solid wall structure preventing leakage of said release material therebeyond.

14. Structure according to claim **6,** wherein said doctoring blade comprises a solid wall structure preventing leakage of said release material therebeyond.

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