United States Patent [19]

Sanders

[11] **3,809,854**

[45] **May 7, 1974**

[54] **ELECTRICALLY CONDUCTIVE FUSER BLANKET**

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[73] Assignee: **Minnesota Mining and Manufacturing Company**, St. Paul, Minn.

[22] Filed: **Mar. 22, 1973**

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[52] **U.S. Cl.** ..... **219/216**, 100/93 RP, 219/469

[51] **Int. Cl.** **H05b 1/00**

[58] **Field of Search** ..... 161/401, 206, 207, 247, 161/189; 219/216, 469; 100/93 RP

[56] **References Cited**

UNITED STATES PATENTS

3,669,706 6/1972 Sanders ..... 219/216 X

3,235,772 2/1966 Gurin ..... 161/401 X

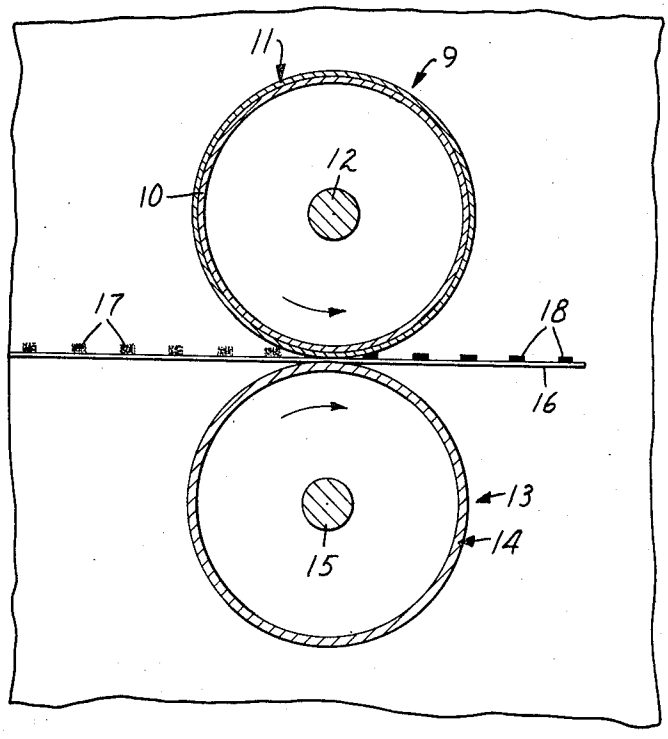
Primary Examiner—C. L. Albritton

Attorney, Agent, or Firm—Alexander, Sell, Steldt and DeLaHunt

[57] **ABSTRACT**

A composite article suitable for use as a fuser blanket comprising a dimensionally stable substrate having bonded to one surface thereof, in ascending order, a resiliently compressible electrically conductive elastomer layer and a thin resiliently compressible silicone elastomer layer. The blanket is especially well suited for use in copier systems wherein electrostatic charging of photoconductive coated paper is utilized.

9 Claims, 2 Drawing Figures



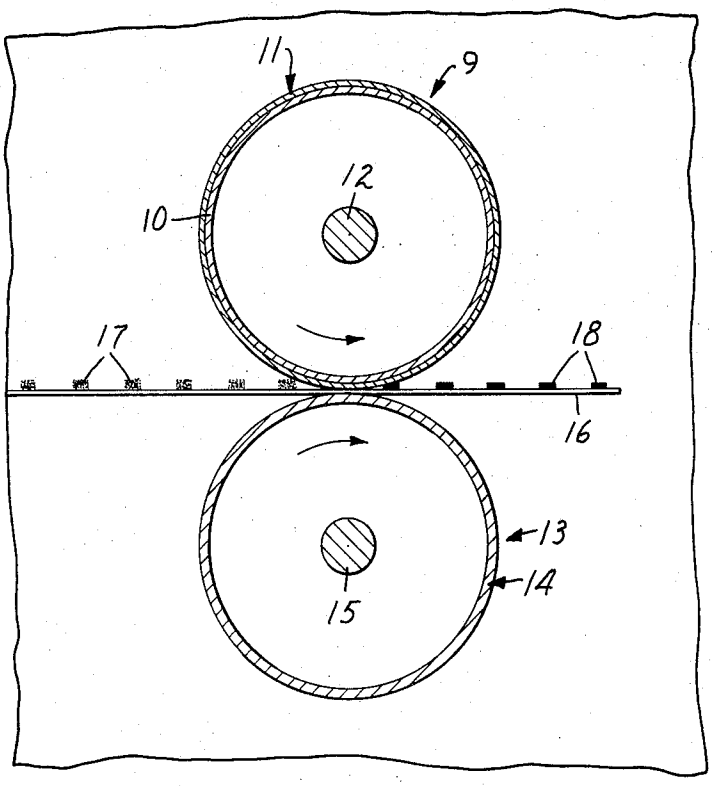


FIG. 1

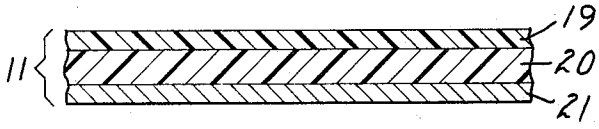


FIG. 2

ELECTRICALLY CONDUCTIVE FUSER BLANKET

BACKGROUND OF THE INVENTION

This invention relates to the field of duplication wherein heat fixing systems for fixing images of powdered thermoplastic marking media to receptor surfaces, e.g., in automatic copiers or reproducers, are utilized. More particularly it relates to an improved fusing blanket construction for use in electrophotographic fixing systems.

The use of thermoplastic resin material in particulate form for the purpose of forming images in copying machines or the like has generated various devices for adhering the particulate material to the desired receptor surfaces, especially in the form of sheets. It is necessary that the particulate resin material, hereinafter referred to as ink or toner powder, be fused or softened to a tacky state such that it can adhere to the receptor surface, and upon cooling will be bonded to the receptor surface to form images thereon. It is important in fixing the ink to the receptor surfaces that the ink is not disturbed as far as location on the receptor surface and that the ink is not offset so as to distort the image character.

Fusing devices which have been utilized for this image fixing generally include a pair of nip rolls, one being a heated fusing roller having a peripheral surface which has a low affinity for the fused or softened ink, and the other being a pressure or backup roll. The receptor element, generally a sheet of paper, bearing the particulate ink advances between the nip area of the rollers whereby the ink is to be fused and bonded to the receptor surface. The peripheral surface of the fusing roller must have a sufficiently low affinity for the softened ink such that the tacky ink particles preferentially adhere to the receptor surface rather than the fuser roll surface. If these particles do stick to the fuser roll surface, a splitting of the image occurs, such that a partial or ghost image results on the next advancing sheet. This produces what is commonly termed in the duplicating art on offset image.

In duplicating systems wherein development is by electrostatic charging of photoconductive coated receptor sheets, the surface of a fusing roller must also be sufficiently electrically conductive to prevent buildup thereon of a high electrical surface potential. If the surface potential of the fusing roller becomes too high, the receptor sheet may be drawn to the fuser roll via electrostatic forces and attempt to wrap around the fuser roll.

One approach to providing a surface for the fusing roller which has a low affinity for the softened ink is by using nip rolls which may be coated with a tetrafluoroethylene resin such as Teflon (tradename) and a system for dispensing a silicone oil (a dimethyl siloxane polymer) onto the heated fusing roll, as taught by U. S. Pat. Nos. 3,291,466; 3,331,592; 3,449,548; and 3,452,181. While this method affords a peripheral surface with low affinity for the softened ink, this approach does not prevent the buildup of a high electrical potential on the roller periphery.

Another method designed to eliminate problems encountered with liquid dispensing systems is to provide a silicone elastomer surface for the heated fusing roll, as is taught in U. S. Pat. No. 3,669,707. While providing a surface with low affinity for the softened ink, buildup of electrical potential to an unsatisfactorily high level is again not prevented.

This invention provides a fusing blanket which retains the beneficial silicone elastomer surface for offset prevention while being sufficiently electrically conductive to prevent excessive buildup of electrical potential on the periphery thereof. This is accomplished by providing a fuser blanket in the form of a composite construction comprising a substrate, generally heat-conductive, having bonded thereto, in ascending order, an elastomer layer containing a suitable concentration of an antistatic material or an electrically conductive filler and a thin silicone elastomer overlayer having good toner powder release characteristics. The intermediate elastomer layer has sufficient electrical conductivity to prevent excessive static electrical potential buildup. However, this electrically conductive elastomer will not generally provide for satisfactory toner powder release characteristics, e.g., because of filler or antistatic materials contained therein. Therefore, it is necessary to provide an overlay of a thin silicone elastomer having such release properties. Because of the thinness, this overcoat is, however, not capable of supporting the 500 to 2,500 volt electricall potential which has been observed in fuser blankets containing only nonconductive elastomers, and therefore does not detract from the electrical characteristics of the intermediate elastomer layer.

SUMMARY OF THE INVENTION

In accordance with the invention, there is provided a composite article useful as a fuser blanket comprising a dimensionally stable substrate having bonded to one surface thereof an electrically conductive layer of a resiliently compressible elastomer and a thin resiliently compressible silicone elastomer outer layer bonded thereto.

The composite blanket can be conveniently utilized in copier systems, particularly when electrostatic charging of photoconductive coated paper is utilized. The blanket is sufficiently electrically conductive to prevent buildup of a high electrical surface potential on the blanket periphery, yet has surface characteristics to allow proper toner powder release.

DETAILED DESCRIPTION OF THE INVENTION

To illustrate the invention, accompanying drawings are presented wherein

FIG. 1 is a simple schematic view of a fusing device wherein the fuser blanket is utilized, and

FIG. 2 is a cross-section of the preferred fuser blanket. It should be noted that the drawings are illustrative only and do not represent actual dimensions of the components therein.

Typically, the fuser device illustrated in FIG. 1 has a fusing roller **9** and a backup roller **13.** The fusing roller **9** comprises a hollow drum **10** of a heat conductive material such as aluminum, generally having a heat source therein (not illustrated). This is to provide sufficient heat to the periphery of the fusing blanket **11** covering the drum to fuse the ink **17** to the receptor **16.** The fused ink is shown as **18.** The fusing blanket is preferably wrapped around the drum **10** and releasably attached thereto. The outer peripheral surface of the fusing blanket generally has about a 15 inch circumferential extent so as to permit fusing of developer to a 14 inch receptor upon a single revolution of the fuser roll.

The fuser roll has a shaft **12** connected thereto which can be utilized to drive the fuser roll.

Backup roller **13** comprises a hollow drum, typically of aluminum, with an exterior surface coating **14** typically of polytetrafluoroethylene providing a rigid peripheral surface. The backup roller has a shaft **15** connected thereto which can be used to drive the roller. Fusing pressure, i.e., the pressure required to force a receptor sheet **16** into intimate contact with fusing blanket **11**, is generally applied by the backup roller via convenient means such as, for example, compression springs.

In use, the fusing roller **9** is actuated as a receptor sheet containing imaged toner powder thereon approaches the nip area between fusing roller **9** and backup roller **13**. Fusing pressure is applied at the nip area by the backup roller **13** and heat is applied to the fusing blanket typically by a source within the fusing drum **10**, thereby fusing the toner powder to the receptor sheet.

FIG. **2** is a cross-section of the preferred fuser blanket **11** of this invention, illustrating a backing member **21** of a dimensionally stable material having bonded thereto a resiliently compressible electrically conductive elastomeric layer **20** and bonded thereover a thin silicone elastomer overlayer **19**. Overlayer **19** is the surface of the blanket contacted by the fusible toner powder positioned on the advancing receptor sheet. Preferably the dimensionally stable substrate **21** is a thin, flexible metallic sheet material. However, the substrate can alternatively be the surface of fusing roller **10**.

For commercial duplicating systems, a fuser blanket must typically possess certain characteristics. First, the blanket must be resiliently compressible so as to provide an area of intimate contact with the receptor when pressure is applied at the nip via the backup roller. Secondly, the blanket must be capable of withstanding pressures in excess of about 100 psi at operating temperatures in excess of about 200°C. while maintaining its physical and dimensional integrity. Third, the blanket surface must have a low affinity for the toner powder under fusing conditions. When development techniques are utilized involving electrostatic charging, the blanket should also be sufficiently electrically conductive to prevent buildup of a high electric potential on the surface thereof which could interfere with the satisfactory operation of the fusing system.

Typical silicone elastomer surfaces, while satisfying the first three aforementioned characteristics, are not sufficiently electrically conductive to prevent a high electrical surface potential buildup, a characteristic necessary when development techniques involving electrostatic charging are utilized in the copier system. Adding conventional fillers such as carbon black to provide an electrically conductive surface would require such a concentration of filler so as to render the elastomer unsuitable as a release surface. For example, exposure of such filler particles during use may give rise to surface areas having an affinity for the softened toner powder. The softened toner powder retained on the surfaces of the fuser roller may split the image and carry a portion of the powder to the next advancing receptor to produce a ghost or offset image. By providing a very thin silicone elastomeric coating having good toner powder release over a resiliently compressible, electrically conductive elastomeric layer, a fusing blanket is attained which will meet all of the aforementioned criteria. The thin silicone elastomeric overcoat is not capable of supporting the 500 to 2500 volt surface potential observed in non-conductive fuser blankets yet will provide good toner powder release.

The backing material or substrate suitable for use in the fuser blanket of my invention must be dimensionally stable at elevated temperatures. Additionally, when fusing temperatures are attained by heating means within the fuser roller, the substrate must be heat conductive. While the surface of the fusing roller itself can be utilized as the substrate, it is preferred to utilize a separate substrate or backing material. This is because insertion of a replacement fusing blanket is simplified to a great extent. If the blanket is formed on the surface of the fusing roller, the entire roller must be replaced. Conversely, when a separate backing is utilized, the blanket can be releasably attached to the fusing roller to facilitate replacement. Metallic sheet material is exemplary of suitable material possessing the aforementioned characteristics. A preferred backing is stainless steel, although materials such as aluminum, copper, and brass are also satisfactory. Substrate thicknesses should be sufficient to provide strength and dimensional stability and yet be flexible enough to easily conform to the fuser roller. Generally, thicknesses in the range of about 2 mils to about 15 mils, and preferably about 5 mils, are satisfactory. Decreasing thickness tends to provide greater flexibility, thereby facilitating conformance of the composite blanket to the fuser roller, but provides decreased strength and dimensional stability. Conversely, increasing thicknesses provide greater strength but less flexibility.

Electrically conductive elastomeric layer **20** is constructed of a resiliently compressible material having sufficient mechanical strength to resist tearing during use and containing a sufficient quantity of electrically conductive filler or other material having suitable conductivity or antistatic properties to provide the electrical conductivity necessary to prevent a buildup of a high electric potential, i.e., greater than about 500 volts, on the fuser blanket periphery during use. This elastomeric layer must be sufficiently thick to provide mechanical strength to resist tearing and also a useful nip area. For this purpose, layer **20** should be at least about 10 mils thick. For economy of materials, the thickness of layer **20** is preferably less than 250 mils thick, although thicker layers are also useful. The spacial relationship between backup roll **13** and fuser roll **9** must be such that the backup roll **13** deforms the surface coverings, i.e., the fuser blanket of fuser roll **9**, to form a nip area of substantial width extending the full length of the contacting area. Therefore, resilient layer **20** of fuser roll **9** must have sufficient softness to provide a suitable nip area. For this purpose, the elastomer utilized to form layer **20** should have a hardness value of from about 2 to about 60 Shore A durometer, and preferably from 2 to 3 Shore A durometer.

An example of an excellent choice of elastomeric material providing the above-mentioned characteristics is a peroxide cured vinyl methyl polysiloxane polymer containing therein an antistatic or conductive material. An exemplary composition is a peroxide curable carbon black filled polysiloxane such as that sold under the tradename Union Carbide K-1516, which has been diluted with an equal amount of a high tear strength curable polysiloxane, such as Dow Corning 35U (trade-

name). Another exemplary composition is the aforementioned Union Carbide K-1516 diluted with an equal amount of a curable high molecular weight silicone gum such as Dow Corning 430 (tradename).

Other exemplary materials which are curable to provide a resiliently compressible elastomer having sufficient mechanical strength to resist tearing include curable fluorinated polymers. Exemplary of such polymers are fluorosilicones, generally termed perfluoro alkyl alkylene siloxanes. These polymers contain a terminal perfluoro alkyl group which is positioned no closer than two carbon atoms from the silicon atom, and additionally contain a minor amount of substituent groups which will allow curing or crosslinking to occur. These substituent groups can for example be silicon-bonded hydrogen atoms, vinyl groups, or peroxy-activatable groups.

Linear saturated fluorinated copolymers of vinylidene fluoride and fluoromonoolefins, as disclosed in U. S. Pat. No. 3,655,727, are also exemplary of suitable curable fluorinated polymers. The preferred are those produced by copolymerizing perfluoropropene and vinylidene fluoride as described in U. S. Pat. Nos. 3,051,677 and 3,318,854. These fluorinated polymers can be conveniently filled with a suitable electrically conductive filler to provide the desired electrical properties therein.

This elastomeric, resiliently compressible, electrically conductive layer can be conveniently formed by curing the polymers in situ at the time of manufacture of the blanket. Curing or cross-linking agents are generally well known in the art. For example, curing agents such as benzoyl peroxide, 2,4-dichlorobenzoylperoxide, tertiarybutyl perbenzoate, dicumyl peroxide, or the like are satisfactory for curing silicone or fluorosilicone compositions. Curing systems for vinylidene fluoride/fluoromonoolefin copolymers are taught in U. S. Pat. No. 3,655,727. Curing conditions vary depending upon the curable polymers and curing agent chosen, effective cures being obtained at temperatures up to about 450°F. for a period of from about 1 minute to about 15 hours, and more usually from about 5 minutes to about 1 hour.

Silicone elastomers suitable for use in the thin resiliently compressible overlayer of this invention are characterized and described in U. S. Pat. No. 3,554,836, incorporated herein by reference. Exemplary silicone elastomers include the cured or further polymerized product of a silicone gum such as dimethyl vinyl polysiloxane sold under the tradename SE-33 by the General Electric Company. The preferred blanket surface comprises an elastomer prepared from a mixture of the above-mentioned gum with a silicone resin such as that sold under the tradename Sylgard 184, with equal parts by weight of the gum and resin being the preferred mixture. However, other proportions of these ingredients are also useful. For example, from 30 to 100 parts by weight of gum with correspondingly from 70 to 0 parts by weight of resin will product a useful blanket surface. A cured surface composed of the silicone resin containing less than 30 percent by weight of the silicone gum may be too hard to be useful in this invention.

For the preparation of the silicone elastomer layer, curing agents such as benzoyl peroxide, 2,4-dichlorobenzoyl peroxide, tertiary butyl perbenzoate, dicumyl peroxide, or the like are satisfactory. When the aforementioned silicone resin is included, the preferred curing agent is a mixture of low molecular weight polydimethyl siloxane containing silyl hydrogen groups and an initiative catalyst, such as the curing agent sold under the tradename Sylgard 184 Curing Agent.

Curing conditions vary depending on the curing agents and the silicone gums or resins, with effective cures being obtained at temperatures up to 400°F.

The silicone elastomer thickness should be sufficient to permit adequate wear life in terms of abrasion resistance without supporting buildup of an excessive electrical potential. Typically, about 0.3 mils to about 8 mils is satisfactory with 4 mils being preferred.

The hardness of the silicone elastomer utilized in the outer layer should be such as to allow sufficient elongation without tensile failure, typically in the range of about 10 to about 70 Shore A durometer, and preferably 30 Shore A durometer. An elastomer formed from equal parts of the aforementioned silicone gum and resin typically has a Shore A durometer value of 20 to 30, a tensile strength of 370 psi, a percent elongation at break of 240 and a tear strength of 60 piw.

In the manufacture of the fuser blanket of this invention, catalyzed, curable, electrically conductive polymer can conveniently be applied to a substrate by conventional means, such as calendering, bulk loading, or in a preform fashion to the desired uniform thickness. The structure can then be inserted into a mold and cured at from about 200°F. to about 400°F. under a pressure of about 100 to 1000 psi. Cure can be effected generally in from about 5 to about 30 minutes in this manner.

It may be desirable to prime the substrate prior to bonding of the electrically conductive intermediate layer thereto. This is especially true when curable fluorinated materials are utilized as the intermediate layer, so as to insure an adequate bonding to the substrate. Such primers are commercially available. For example, Dow Corning A-4040 (tradename) is an acceptable primer for a substrate when bonding fluorosilicone elastomers thereto. Similarly, an adhesive sold under the tradename Chemlok No. 607 (tradename) or a primer consisting of equal parts of a 50 weight percent solution of Chemlok No. 607 (tradename) in methyl alcohol and a 2 weight percent solution of Union Carbide Z-6020 (tradename) in methyl alcohol are satisfactory substrate primers when utilizing curable vinylidene fluoride/fluoromonoolefin copolymers.

When utilizing a separate backing sheet material (as opposed to the fusing roller itself) as a substrate, the cured structure can be conveniently die cut to any desired configuration prior to application of the thin silicone elastomer overlayer.

The curable silicone overlayer composition can be applied to the cured, electrically conductive elastomer layer by any convenient manner, such as spraying, knife coating, brush coating, or dip coating. A preferred application method is by spraying a solution of the curable catalyzed silicone composition in a volatile solvent, such as heptane, toluene, or xylene. The concentration of the silicone composition in an application solution can generally be from about 10 to about 20 weight percent when spraying is utilized, while about 50 weight percent or greater when coating is the application method utilized.

The curable silicone composition overlayer and the composite blanket can then be conveniently cured and

the composite blanket can then be conveniently cured and postcured at about 400°F. for from about 2 hours to about 24 hours. Postcuring of the composite structure is desired to develop high temperature stability, to maximize the physical properties of the fusing blanket, and to increase the adhesion of the thin silicone outer layer to the intermediate conductive layer.

The toner powders to be fused to the receptor sheet utilizing the fuser blanket of this invention are generally heat fusible materials in particulate form with an average particle size of about 7 microns. A typical suitable toner powder has the following composition in percentages by weight:

44%	Epon 1004 (tradename for an epoxy resin available from the Sheel Chemical Co.)
52%	magnetite
4%	carbon black

Another suitable developed powder consists of 65 weight percent polystyrene and 35 weight percent carbon black.

The temperature at which the fusing blanket operates may vary from about 230°F. to about 425°F. depending upon the choice of toner powder and the desired rate of fuser operation.

In order to more clearly illustrate the invention, the following nonlimiting examples are provided wherein all parts are by weight unless otherwise specified.

EXAMPLE 1

A catalyzed silicone composition is prepared by mixing on a conventional rubber mill:

50 parts	Union Carbide K-1516 (tradename for a carbon black-filled silicone rubber available from the Union Carbide Corp.)
50 parts	General Electric SE-33 (tradename for a dimethyl vinyl silicone gum available from the General Electric Co.)
1.0 parts	Dicup R (tradename for dicumyl peroxide, available from the Hercules Chemical Co.)

The catalyzed composition is applied to a 5 mil thick stainless steel sheet (Type 302 stainless with a No. 2 finish, ¼ hard) in a preform fashion and inserted into a 320°F. conventional compression mold. The silicone polymer composition is cured at 1000 psi for 5 minutes in the mold. The thickness of the cured silicone elastomer layer is 125 mils.

A spray solution of catalyzed silicone gum and resin is prepared by dissolving

1.5 part	Dow Corning No. 184 sylgard (tradename for a resin available from the Dow Corning Corp.)
2.0 parts	General Electric SE-33
0.5 parts	Dow Corning No. 184 Catalyst (tradename for silicone resin curing catalyst from the Dow Corning Corp.)
in 45 parts	heptane

The solution is applied to the cured filled silicone elastomer by conventional spraying in a spray booth.

This silicone overlayer is cured and the composite fuser blanket is postcured simultaneously for 5 hours in a 400°F. environment. The thickness of the cured silicone elastomer overlayer is 4 mils.

Copies are developed by a technique involving electrostatically charging a zinc oxide coated paper with a corona at a potential of 600 to 800 volts. The composite fuser blanket is mounted on a fuser device as illustrated in FIG. 1. After fixing 10 copies (8½ inch × 14 inch) the surface potential of the blanket is measured to be approximately 200 volts. (This potential is measured by utilization of a Monroe Electrostatic Voltmeter at ambient conditions of 72°F. and 50 percent relative humidity.)

Contrasting the operation of this fuser blanket, a blanket is prepared in exactly the same manner as above except without utilizing the Union Carbide K-1516 carbon black-filled silicone resin in the intermediate layer. When mounted on the fuser device and tested under the same conditions, greater than 2500 volts was observed by the Monroe Voltmeter after only 5 copies. The copy sheets attempted to wrap around the fuser roll periphery due to the electrostatic forces present.

EXAMPLE 2

A catalyzed silicone composition is prepared by mixing on a conventional rubber mill:

50 part	Union Carbide K-1516 (tradename for a carbon black-filled silicone resin available from Union Carbide Corp.)
50 parts	Dow Corning 35U (tradename ofr a silicone available from the Dow Corning Corp.)
1.0 part	Dicup R (tradename for a dicumyl peroxide, available from the Hercules Chemical Co.)

The catalyzed composition is applied to a 5 mil thick stainless steel sheet (Type 302 stainless with a No. 2 finish, ¼ hard) in a preform fashion and inserted into a 320°F. conventional compression mold. The silicone polymer is cured at 1000 psi for 5 minutes in the mold. The thickness of the cured elastomer layer is 125 mils.

A spray solution of catalyzed silicone gum and resin is prepared by dissolving

100	Dow Corning 291 (tradename for a silicone available from the Dow Corning Corp.)
1 part	TYZOR, TBT (tradename for tetrabutyltitanate, available from the DuPont Co.)

The solution is applied to the cured filled silicone elastomer by conventional spraying in a spray booth.

This silicone overlayer is cured and the composite fuser blanket is postcured simultaneously for 5 hours in a 400°F. environment. The thickness of the cured silicone elastomer overlayer is 4 mils.

The composite fuser blanket is mounted on a fuser device as illustrated in FIG. 1. Copies are developed as in Example 1. After fixing 10 copies (8½ inch × 14 inch) the surface potential of the blanket is measured to be approximately 150 volts. (This potential measured by utilization of a Monroe Electrostatic Voltmeter at ambient conditions of 72°F. and 50 percent relative humidity.)

Contrasting the operation of the fuser blanket, a blanket is prepared in exactly the same manner as above except without utilizing the Union Carbide K-1516 carbon black-filled silicone resin in the intermediate layer. When mounted on the fuser device and tested under the same conditions, greater than 2500 volts was observed by the Monroe Voltmeter after only 10 copies. The copy sheets attempted to wrap around the fuser roll periphery due to the electrostatic forces present.

EXAMPLE 3

A catalyzed silicone composition is prepared by mixing on a conventional rubber mill

100 parts	Union Carbide Y8134 (tradename for a curable vinyl silicone containing an anti-static material, available from the Union Carbide Corp.)
1 parts	Benzoyl peroxide

The catalyzed composition is applied to a 5 mil thick stainless steel sheet (Type 302 stainless with a No. 2 finish, ¼ hard) in a preform fashion and inserted into a 260°F. conventional compression mold. The silicone polymer is cured at 1000 psi for 5 minutes in the mold. The thickness of the cured silicone elastomer layer is 125 mils.

A spray solution of catalyzed silicone gum and resin is prepared by dissolving

2.0 parts	Dow Corning 430 (tradename for a silicone gum available fro the Dow Corning Corp.)
1.5 parts	Dow Corning No. 184 Sylgard (tradename for a silicone encapsulating resin available from the Dow Corning Corp.)
0.5 parts	Dow Corning No. 184 Catalyst (tradename for silicone resin curing catalyst from the Dow Corning Corp.)
in 45 parts	heptane

The solution is applied to the cured filled silicone elastomer by conventional spraying in a spray booth.

This silicone overlayer is cured and the composite fuser blanket is postcured simultaneously for 5 hours in a 400°F. environment. The thickness of the cured silicone elastomer overlayer is 4 mils.

The composite fuser blanket is mounted on a fuser device as illustrated in FIG. 1. Copies are developed as in Example 1. After fixing 10 copies (8½ inch × 14 inch) the surface potential of the blanket is measured to be approximately 200 volts. (This potential is measured by utilization of a Monroe Electrostatic Voltmeter at ambient conditions of 72°F. and 50 percent relative humidity.)

What is claimed is:

1. A composite article suitable for use as a fuser blanket comprising:

a dimensionally stable substrate having bonded to one surface thereof a resiliently compressible, electrically conductive elastomeric layer, and overlying said elastomeric layer and bonded thereto a thin, resiliently compressible layer comprising a silicone elastomer.

2. The article of claim 1 wherein said electrically conductive elastomeric layer comprises a carbon black-filled silicone elastomer.

3. The article of claim 1 wherein said electrically conductive elstomeric layer comprises a carbon black-filled fluorinated elastomer.

4. The article of claim 3 wherein said fluorinated elastomer is a fluorosilicone elastomer.

5. The article of claim 3 wherein said fluorinated elastomer is a cured linear saturated copolymer of vinylidene fluoride and at least one fluoromonoolefin.

6. The article of claim 5 wherein said fluoromonoolefin is perfluoropropene.

7. The article of claim 1 wherein said dimensionally stable substrate is comprised of a thin, flexible, metallic sheet material.

8. The article of claim 7 wherein said sheet material is stainless steel.

9. The article of claim 1 wherein said electrically conductive elastomeric layer comprises an elastomer containing an anti-static material therein.

* * * * *

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,809,854 Dated May 7, 1974

Inventor(s) JAMES F. SANDERS

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

Column 4, line 59, change "3" to -- 30 --.

Column 7, line 51, change "sylgard" to -- Sylgard --, and after "(tradename for a" please add -- silicone encapsulating --.

Column 8, line 37, after "100" add -- parts --.

Signed and sealed this 10th day of September 1974.

(SEAL)
Attest:

McCOY M. GIBSON, 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

UNITED STATES PATENT OFFICE
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FORM PO-1050 (10-69)

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