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(54) **Heat sealable electrostatic recording sheet.**

(57) A heatsealable electrostatic recording sheet is provided which includes an electrically conductive substrate, a dielectric coating on one surface and a heatsealable coating on the other side. The dielectric coating is composed of an electric-charge-retentive layer of an insulating or dielectric polymer film. The film also contains dispersed therein, pigment particles and preferably an antiblocking agent selected from the groupe consisting of dielectric alkaline earth metal salts of fatty acids, alkali metal salts of fatty acids, waxes, and mixtures thereof and in particular calcium stearate. The heatsealable coating is composed of a thermoplastic film-forming polymeric material which contains an electrically conductive additive, such as a polymeric quaternary ammonium halide, and in particular, polydialkyl diallyl ammonium halide.

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HEAT SEALABLE ELECTROSTATIC RECORDING SHEET

Background of the Invention.

This invention relates to an electrostatic recording sheet which can be heatsealed to substrate member, and more particularly to the combination of an electrically conductive base having an electric-charge-retention dielectric layer on one side and an electrically conductive heatsealable layer on the other side.

Brief Description of the Prior Art.

In the garment industry, heatseal paper, either diazo-sensitized or unsensitized, has come into wide spread usage. The use of heatseal whiteprinting systems in the ready-made clothing industry provides a method which both increases production and improves quality. In recent years in particular, the garment industry has been characterized by the use of faster and better machines. For the drawing and cutting rooms to keep pace with these developments, the industry has employed sensitized heatseal sheets by means of which a pattern can be placed quickly and accurately onto the material. The procedure is simple: a master marker (or original) is made by whiteprinting the patterns onto sensitized master paper. This is done by placing the pattern pieces onto a sheet of sensitized paper of the same dimensions as the material. The sensitized paper is then exposed by an electrically operated exposure unit which decomposes

the sensitized layer from the spaces left uncovered by the pattern pieces. After development in a suitable develping unit, such as a GAF Pattern Printer, the master marker is ready.

From the master marker, an unlimited number of markers can be produced by the GAF Pattern Printer. In some cases, for example, for small series, variable layouts of varying material widths, the master marker can be omitted and the pattern traced directly onto translucent pattern paper. Herefrom it is possible to make several heatseal prints (copies) if desired in one operation.

The master marker is then run through the GAF Pattern Printer in contact with sensitized paper. The sensitized paper is exposed and automatically developed inside the machine and it comes out as a copy, bearing a true image of the original pattern (an exact copy of the "Master"). In the cutting room, the new copy is heatsealed onto the top layer of cloth on the cutting table. It is ironed on crosswise in order to obtain a firm bond. After the garments are cut, the paper can easily be removed from the cloth without leaving a trace.

By using this method, a library of masters is maintained and when copies are required, they can be quickly produced, thus making it totally unnecessary to store extra copies.

Heatseal materials are dimensionally stable to a very high extent and, therefore, the copy provides a dimensionally exact image of the pattern pieces. Calculated yardage remains constant and no tolerances have to be taken into account.

The garment industry, most recently, has begun to employ computerized plotters in combination with dielectric printers for producing their patterns. The dielectric paper can then be used as a master for reproduction on diazo-heatseal paper.

While it might appear to be desirable to merge the well-established heatseal print system with a dielectric printing system, such as disclosed for example in U.S. Patent 3,887,903, the dielectric coated papers are incompatible with the step of heatsealing to a fabric by using a hot iron and the required heatseal coating would provide the dielectric film with an electrically insulated surface

and, therefore, inoperative.

Summary of the Invention.

It has now been found that a modified dielectric fllm can be provided with a modified heatseal coating to provide a dielectric paper which can both be used in electrostatic plotters and heat-sealed to a substrate material.

In accordance with the present invention, a heatsealable dielectric film is provided which includes an electrically conductive substrate, a dielectric coating on one surface and a heatsealable coating on the other side.

The dielectric coating is composed of an electric-charge-retentive layer of a film forming insulating or dielectric polymer. The polymer also contains dispersed therein, pigment particles and preferably an anti-blocking agent selected from the group consisting of dielectric alkaline earth metal salts of fatty acids, alkali metal salts of fatty acids, waxes, and mixtures thereof. The heat-sealable coating is composed of a thermoplastic film-forming polymeric material which contains an electrically conductive additive, such as a polymeric quaternary ammonium halide, and in particular, polydialkyl diallyl ammonium halide. The electric-charge-retention layer preferably includes calcium stearate, but advantageously can include other materials having dielectric properties which are compatible with the dielectric polymeric film, as for example, waxes including the natrual animal waxes, the mineral waxes and the synthetic waxes. Other alkali and alkaline earth metal salts of fatty acids can also be advantageously employed.

Description of the Preferred Embodiments.

The product of the invention is a coated paper, the paper base of which has a high degree of conductance and carrying on one side only, a substantially non-conductive or dielectric resinous layer which serves as an electric-charge-retentive layer.

The insulating resinous polymer materials forming the electric-charge-retentive layer are homopolymers or copolymers, polymerized from monomers or their derivatives, such as vinylchloride, vinylacetate, vinylidenechloride, methylacrylate, ehthylacrylate,

butylacrylate, 2-ethylhexylacrylate, methylmethacrylate, ethylmethacrylate, vinylmethyl ether, vinylethylether, vinylisobutyl ether, vinylpyrrolidone, styrene, cumarone, indene, acrylonitrile, butadiene and the like, and other polymers and cellulose derivatives such as nitrocellulose, celluloseacetate and polyamide, and mixtures of said polymers or cellulose derivatives; and particularly, the resinous polymers consist at least partially of polymeric solid particles of homopolymer or copolymer polymerized from above-mentioned monomers, their derivatives or other polymers. For example, the electric-charge-retentive layer may be a film, consisting of vinylidenechloride-methylmethacrylate copolymer, which is at least partially formed by polymeric solid particles of vinylidenechloride-methylmethacrylate copolymer having a higher degree of polymerization. For another example, the electric-charge-retentive layer may be a film, consisting of isobutylacrylate-methylmethacrylate-acrylonitrile copolymer and acrylonitrile polymer, at least partially formed by polymeric solid particles of acrylonitrile polymer.

Other insulating or dielectric resins which can be used include silicone and organo-silicone resins, acid modified polyvinyl acetate, such as crotonic acid-modified polyvinyl acetate, polyvinyl butyral, wax, shellac, petroleum resins, coal tar resins, and the like. Additional binder materials disclosed in the prior art which can be used to form the dielectric coating include polyolefins, such as polyethylene and polypropylene, unmodified or oil-modified alkyd resins, styrenated alkyd resins, oil modified styrenated alkyds, saturated polyester resins, polyvinyl acetates, polyvinyl chlorides,propylene modified polyvinyl chlorides, polyvinyl butyral, vinyl chloride-vinyl acetate maleic acid terpolymers, copolymers of ethylene and vinayl acetate, acrylic acid ester polymers, methacrylic acid ester polymers, polystyrene, butadiene-styrenecopolymers, styrene-ethylene copolymers, ethyl cellulose, cellulose acetate butyrate, cellulose acetate propionate, cellulose nitrate, sucrose esters (e.g. sucrose benzoate and the like) and polysulfones.

The dielectric coating can include pigments such as

calciumcarbonate, zincsulphide, lithopone, magnesiumoxide, ammonium-stearate, bariumsulfate, organophilic pigment (containing ethylene/acrylic acid copolymer) and clay.

The electric-charge-retentive layer requires preferably the use of an anti-blocking or lubrication agent in order to facilitate a smooth moving of the iron when the heatsealable layer is being fused to a fabric.

While calcium stearate is the preferred agent, other agents can be used, as for example, alkali and alkaline earth metal salts of fatty acids and waxes, including the natural animal waxes, such as beeswax, spermaceti, lanolin and shellac wax; the vegetable waxes, such as carnauba, candelilla, bayberry and sugarcane; and mineral waxes, such as the fossil or earth waxes and petroleum waxes, such as paraffin and microcrystalline petrolatum. The synthetic waxes include ethylene polymers and polyol ether-esters, such as sorbitol, chlorinated napthalenes and hydrocarbon waxes. The wax must have good dielectric properties and be compatible with the binder and pigment.

The anti-blocking or lubricating agent has been found to provide improved liquid toner adhesion; improved ironing properties of the coating, and prevention of toner image smearing during the ironing process.

The unique combination of a dielectric-conductive heat-sealable sheet was found to have a surprising cost savings. Cheap, relatively low conductive base materials were found to produce the same results heretofore attainable only with more expensive, higher conductivity base materials. The improved results appear to be, at least in part, attributable to the penetration of the conductive heatseal coating.

The heatseal coating is provided with a material which renders the coating electrically conductive, but does not adversely affect the heatseal properties of the coating. Because of the nature of electrically conductive materials, the following problems can be encountered when modifying a heatseal material:

1. loss of heatseal properties; and

2. transfer of part of heatseal coating to the underlying fabric.

Therefore, the selection of a conductive material is critical and it has been found that the following classes of materials produce the desired results:

I. polymeric quaternary ammonium halides

IA. poly(diallyl-dialkyl ammonium chloride)

IB. polydialkyl-divinyl ammonium halides

II. ammonium salts of alkylarylsulfonates

III. electrolytes or conductive salts

IIIA. calcium, sodium or lithium chloride,sodium or ammonium nitrate

IV. carbon black

V. metal powders

VI. surface active agents

The heatsealable filmformers which can be used include polyvinylacetate, copolymer of vinylchloride and vinylacetate, copolymer of vinylacetate and ethylene, copolymer of vinylchloride and maleicacid ester and aqueous dispersion of these.

The heatseal layer can include pigments such as calciumcarbonate, zincsulphide, china clay, titaniumdioxide, oxidized starch and kaolin.

The function of the pigment, preferably calciumcarbonate, in the heatseal layer, is to reduce the tack of the conductive resin component of the coating and thus to prevent blocking of the material on the roll.

The base material, that is, the condictive layer, typically has a surface resistivity in the range of from 4.10^6 to 7.10^6 Ω /square and a bulk resistivity of about 3.10^5 Ω cm. However, in the combination of the instant invention, cheaper materials can be employed, having a surface resistivity in the range from about 6.10^7 to 8.10^7 Ω/square and a bulk resistivity on the order of 4.10^6 Ω cm.

The process of computerized grading of pattern pieces, interactive marker making, and the drawing of full scale apparal marker in preparation for cloth cutting, is disclosed in U.S. patent

3,887,903.

A programmed voltage is applied to an array of densely spaced writing nibs embedded in a stationary writing head. Upon digital command, the nibs selectively create minute electrostatic dots on a dielectric paper as it passes over the writing head. The paper is then exposed to liquid toner to produce a visible permanent image. The paper is then heatsealed to any substrate, such as a woven fabric by applying heat and pressure by means of conventional iron.

The electrostatic recording sheet can be prepared in accordance with the known coating techniques.

EXAMPLE 1

The dielectric coating is prepared by forming a dispersion in 80 l of toluene, of 37.5 kg of an acrylicmethacrylic copolymer, sold under the Trademark E-322 by DeSoto, Inc. (DesPlaines, Illinois), 32.5 kg calcium carbonate, 5 kg calcium stearate and 90 kg of an optical brightener sold under the Trademark Uvitex OB, by Ciba-Geigy, and applying the coating to a conductive base material. The conductive base is a material sold under the Trademark DEC-Base No. 358 by Schoeller. The coating weight on a dry basis is 9 grams per square meter (g/m^2).

The heatseal coating is prepared by forming, in 70 l of methanol, a dispersion of 18.7 l of ethylacetate and 25 kg of a polyvinylacetate sold under the Trademark Vinnapas B60, by Wacker, 10 kg of polydiallyldimethyl ammonium chloride, sold under the Trademark Chemviron 261 by Merck, and 10 kg of calcium carbonate. The Chemviron 260 contains 40% solids by weight. The coating weight on a dry basis is 20 g/m^2.

EXAMPLE II

In accordance with the procedures outlined in U.S. Patent 3,709,728, the disclosure of which is herein incorporated by reference, an electrostatic recording sheet is produced having a 5.8 g/m^2 coating comprising a first layer of 100 parts SBR latex, 2.5 parts melamine formaldehyde and 50 parts pigment (barium sulphate and zinc sulphide) and a second layer of (2.2 g/m^2) of 100 parts carboxylated polyvinyl acetate, 0.5 parts ammonium stearate and 50 parts pigment (barium

sulphate and zinc sulphate).

The first coating is applied to the substrate by mixing with water to produce a solids content of approximately 50%. The coating is cured and rendered resistant to water by subjecting it to 5 minutes of heating at 82°C.

The second coating composition is similarly mixed with sufficient water to yield a 50% solids content and then adjusted to a pH of approximately 9 by the addition of ammonium hydroxide. Curing is achieved by heating at 71°C for 5 minutes, driving off the ammonia and rendering the coating insoluble in water.

As the next treatment, the coated paper was coated over its back face with an aqueous solution of sodium nitrate, at 25% concentration. Such was applied by spraying it onto the paper web, at a rate of about 4.4 g/m^2 (solids basis).

When measured for surface resistivity, the front side of the copy sheet exhibits a surface resistivity of 10^7 ohms per square, and the back side of the copy sheet exhibits a surface resistivity of 10^3 ohms per square.

A heatseal coating is then applied to the back side in accordance with the procedures of Example I.

The recording blank can then be processed to print thereon alphanumeric information, using electrographic short pulse printing procedures.

There are various forms of equipment for electrographic pulse printing available commercially, exemplified by the Printipix Tube produced by Scientific Recorders, the Clevite 4800 made by Gould, the Info-Max and the computer oriented electrostatic printer of Versatec, Inc. Such a printer may include a bank of styli or electrodes which form the printing head in the machine. The recording blank is moved across this printing head, while supported on backup support means which comprise a backup electrode to produce charged regions on the sheet. DC voltage pulses are applied between selected ones of the electrodes and the backup support forming an opposing electrode. The voltage applied between opposed electrodes ordinarily ranges between a threshold voltage of about 340 volts and 1100 volts.

Demonstrating the utility of the recording blank of the invention can be printed in an electrographic pulse printing machine using pulses of 100 microsecond duration. Charged regions on the recording blank are developed using conventional developer material to produce a visible image. Excellent prints exhibiting good image density and resolution are produced by this system.

EXAMPLE III

In accordance with the procedures of British Patent 1,332,139 the disclosure of which is herein incorporated by reference, a heatsealable electrostatic recording sheet can be produced using as the dielectric layer, a film produced from a dispersion of 100 parts SBR latex; 10 parts 30% butadiene, 55% methylmethacrylate, 15% methacrylic acid; and 2 parts polyoxyethylene laurylether. Additionally 10 parts of calcium stearate is employed in the dispersion.

Except with respect to the foregoing, the procedures of Example I are followed to produce a heatsealable electrostatic coating.

EXAMPLE IV

The procedures of Example I are followed, except a 5 μm thickness of a copolymer of vinylidene chloride and methylmethacrylate are used as the dielectric film former, in accordance with the procedures disclosed in U.S. Patent 3,634,135, the disclosure of which is incorporated herein by reference.

EXAMPLE V

The procedures of Example IV are followed except that the dielectric film is formed from 55 parts vinylidene chloride, 40 parts methylmethacrylate and 5 parts acrylic acid in accordance with the teachings of U.S. Patent 3,634,135.

EXAMPLE VI

The procedure of Example I is followed, except that the dielectric film is applied as a coating of 8 g/m^2 of 935 g polyvinyl acetate, 498 g clay, 125 g barium sulfate with 5,000 cm^3 water containing 200 cm^3 of 28% NH_4OH as disclosed in U.S. Patent 3,264,137, the disclosure of which is incorporated herein by

reference. Additionally, 100 g of calcium stearate is employed in the coating.

EXAMPLE VII

The procedure of Example I is followed, except that in accordance with the disclosure of U.S. patent 3,639,640, the disclosure of which is herein incorporated by reference, the conductive substrate is formed by coating and impregnation on a paper having a basis weight of 76 g/m^2 with a solution of 12 parts of a vinylbenzyltrimethyl ammonium chloride polymer having a 32% solids content and sold by the Dow Chemical Company under the designation "DOW QX 2611.7"; 30 parts of methanol and 67.5 parts of ethanol to provide, after drying an electrically conductive coating on one side thereof of 1.56 g/m^2 (4%) and 0.39 g/m^2 (1%) on the other side thereof. The side having the 4% coating of conductive resin is then coated with a dispersion of 10 parts of a polyvinyl butyral resin (sold by Union Carbide Corporation under the designation "Bakelite XYHL"), 11.6 parts of lithophone, 29.6 parts of ethanol and 48.8 parts of toluene to provide, after drying, a thickness of from about 1.25 to 6.25 /um. Additionally, 2 parts of calcium stearate is incorporated in the dispersion. The heatseal coating is then applied to the 1% coating.

EXAMPLE VIII

In accordance with the disclosure of U.S. Patent 3,652,268, the disclosures of which are incorporated herein by reference, a conductive substrate can be formed as described in Examples I, II and III of the patent. The dielectric layer can be formed as described in Examples IV and V of the patent, except that 10% by weight calcium stearate is incorporated in the dielectric coating composition. The heatseal coating is then formed as described in Example I.

EXAMPLE IX

A paper substrate can be formed and rendered conductive in accordance with the procedure of Example 1 of U.S. Patent 3,100,621, the disclosure of which is herein incorporated by reference. The conductive paper can then be provided with a dielectric coating as described in Example I, II or III of the patent, except that calcium stearate

incorporated into the dielectric coating in an amount equal to 5%, 5% and 10% for the formulations of Examples I, II, and III respectively.

EXAMPLE X

An electrostatic recording sheet can be formed following the procedure of Example I or II of U.S. Patent 3,216,853, the disclosure of which is herein incorporated by reference, except that in Example I, 150 parts by weight of calcium stearate is incorporated and in Example II 5 parts of weight of calcium stearate is incorporated with the polyvinyl acetate coating.

The conductive side of the paper is then coated with the heatseal coating as set forth in Example I.

EXAMPLE XI

An electrostatic recording sheet is prepared by coating a paper sheet with titanium dioxide and polyvinyl benzyltrimethyl ammonium chloride as described in the Examples of U.S. patent 3,759,744, the disclosure of which is herein incorporated by reference.The dielectric coating employs 2.5 parts carboxylated polyvinyl acetate, 1 part $CaCO_3$ and 0,2 part calcium stearate.

The heatseal coating is prepared as disclosed in Example I.

EXAMPLE XII

The procedures of previous examples can be followed in combination with a heatseal layer produced from an aqueous, conductive formulation as follows:

120 g Vinamul 6705
40 g Propiofan 590D
50 g water
30 g sodium nitrate
25 g Chemviron 261 (low viscosity)
10 g Kaolin

A coating weight, on a dry basis of 20 g/m^2 can be produced.

Propiofan 590 is a trademark of the BASF Company for a vinyl propionate-acrylate copolymer dispersion used to produce flexible films.

Vinamul 6705 is a trademark of the Scado Company, Zwolle,

Netherlands, for a vinyl acetate-ethylene copolymer.

The ratio of pigment to film-forming resin to anti-blocking agent in the dielectric coating can be in the range from 10/1/0.3 to 1/2/1. The range is preferable in the range from 4/1/0.6 to 1/1/0.8 because this range gives smoothest moving of the iron.

In the heatseal layer, the ratio of pigment to film-forming resin to conductive additive can be in the range from 1/1/0.1 to 1/6/1. However, the range from 1/2/0.3 to 1/4/0.7 is preferred because this range gives both adequate heatseal properties and adequate conductivity level.

C L A I M S

1. A heatsealable electrostatic recording sheet consisting essentially of an electrically cnductive substrate sheet having a dielectric coating on a first side, said dielectric coating being composed of an electric-charge-retentive layer of a film-forming insulating or dielectric resinous polymer, said polymer also containing disperse therein pigment particles and preferably an anti-blocking agent, selected from the group consisting of dielectric alkaline earth metal salts of fatty acids, alkali metal salts of fatty acids, waxes, and mixtures thereof, and a heatsealable coating on a second side, said heatsealable coating being composed of a thermoplastic film-forming polymeric material, said thermoplastic film also containing an electrically conductive additive.

2. The heatsealable electrostatic recording sheet of claim 1, wherein said electrically conductive additive is a polymeric quaternary ammonium halide.

3. Theheatsealable electrostatic recording sheet of claim 2, wherein said polymeric quaternary ammonium halide is a polydialkyl diallyl ammonium halide.

4. The heatsealable electrostatic recording sheet of claim 2, wherein said polymeric quaternary ammonium halide is polydimethyl diallyl ammonium chloride.

5. The heatsealable electrostatic recording sheet of claim 1, wherein said film-forming polymeric material is a polyvinyl acetate.

6. The heatsealable electrostatic recording sheet of claim 1, wherein said film-forming polymeric material is a vinyl chloride-vinyl acetate copolymer.

7. The heatsealable electrostatic recording sheet of claim 1, wherein the ratio of film-forming resin to anti-blocking agent is in the range from about 1 to 0.3, to 2 to 1.

8. The heatsealable electrostatic recording sheet of claim 1, wherein the ratio of pigment to film-forming resin to anti-blocking agent in the diectric coating is in the range from about 10/1/0.3 to 1/2/1.

9. The heatsealable electrostatic recording sheet of claim 1, wherein the ratio of pigment to film-forming resin to anti-blocking agent in the dielectric coating is in the range from about 4/1/0.6 to 1/1/0.8

10. The heatsealable electrostatic recording sheet of claim 1, wherein the ratio in the heatseal layer of the pigment to film-forming resin to conductive additive is in the range from about 1/1/0.1 to 1/6/1.

11. The heatsealable electrostatic recording sheet of claim 1, wherein the ratio in the heatseal layer of the pigment to film-forming resin to conductive additive is in the range from about 1/2/0.3 to 1/4/0.7.

12. The heatsealable electrostatic recording sheet of claim 1, wherein the ratio in the heatseal layer of the pigment to film-forming to conductive additive is in the range from about 1/2/0.3 to 1/4/0.7 and the ratio in the dielectric coating of pigment to film-forming resin to anti-blocking agent is in the range from about 1/1/0.1 to 1/6/1.

13. The heatsealable electrostatic recording sheet of claim 12, wherein the electrically conductive additive is polydimethyl diallyl ammonium chloride.

14. The heatsealable electrostatic recording sheet of claim 13, wherein the film-forming polymeric material is a vinyl chloride-vinyl acetate copolymer.

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European Patent Office

EUROPEAN SEARCH REPORT

Application number 0040650

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim
X	US - A - 4 139 675 (K. NAGAI et al.) * Abstract; claims; column 1, lines 5-66; column 2, line 7 - column 4, line 32; examples; figures *	1-14
A	GB - A - 1 355 003 (ZELLWEGER LTD.) * Claims *	1
A	US - A - 3 672 982 (F.W. TRAVERS) * Claims; abstract *	1
D,A	US - A - 3 652 268 (C.B. ROWE) * Claims; column 2, line 8 - column 3, line 23; examples; abstract *	7-9
A	US - A - 3 481 775 (C.E. ALBERTSON) * Claims; examples; column 2, line 8 - column 4, line 57 *	7-9
A	DE - A - 2 158 081 (GENERAL CO.) * Claims; examples; page 3, last paragraph - page 9, paragraph 1 *	7-9
A	US - A - 4 047 951 (S.L. COOPER) * Abstract; claims *	

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CLASSIFICATION OF THE APPLICATION (Int. Cl.³)

G 03 G 5/10
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A 41 H 3/02

TECHNICAL FIELDS SEARCHED (Int. Cl.³)

G 03 G 5/10
5/02
A 41 H 3/00
3/02

CATEGORY OF CITED DOCUMENTS

X: particularly relevant
A: technological background
O: non-written disclosure
P: intermediate document
T: theory or principle underlying the invention
E: conflicting application
D: document cited in the application
L: citation for other reasons

&: member of the same patent family, corresponding document

☒ The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	18-02-1981	VANNECKE

EPO Form 1503.1 06.78

DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int. Cl. 3)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
A	FR - A - 1 543 224 (ELECTROGRAPH CORP.) * Abstract; page 1, column 2, paragraph 1 - page 2, column 1, paragraph 1 * --		
A	FR - A - 2 003 385 (MESSERLI) * Claims; page 1, line 1 - page 3, line 30 * & GB - A - 1 216 613 --		TECHNICAL FIELDS SEARCHED (Int. Cl. 3)
A	GB - A - 1 122 730 (G.A.F.) * Claims; page 1, lines 11-43; page 1, line 81 - page 2, line 34 * ----		