(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 484 974 A1**

(12) EUROPEAN PATENT APPLICATION

(21) Application number: **91119088.2**

(51) Int. Cl.5: **C25D 1/10**, B44C 1/22

(22) Date of filing: **08.11.91**

(30) Priority: **09.11.90 US 612223**
01.11.91 US 786383

(43) Date of publication of application:
13.05.92 Bulletin 92/20

(84) Designated Contracting States:
DE ES FR GB IT

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(54) A method of making artistic prints (II).

(57) Disclosed herein is a method of making a dry point engraving. To do so a soft base (100) in which an artist may readily and with a minimum amount of pressure make an artistic creation is used. Applied to the surface of the base is a composition (102) which will take the shape of the surface and is removable therefrom. When removed it presents a mirror image of the base surface. The composition is then coated with a film of electrically conductive material and immersed in an electroplating bath. Here it is plated with metal. Once removed from the bath, the metal is removed from the composition, it having the same representation of the surface of the soft material originally worked on by the artist.

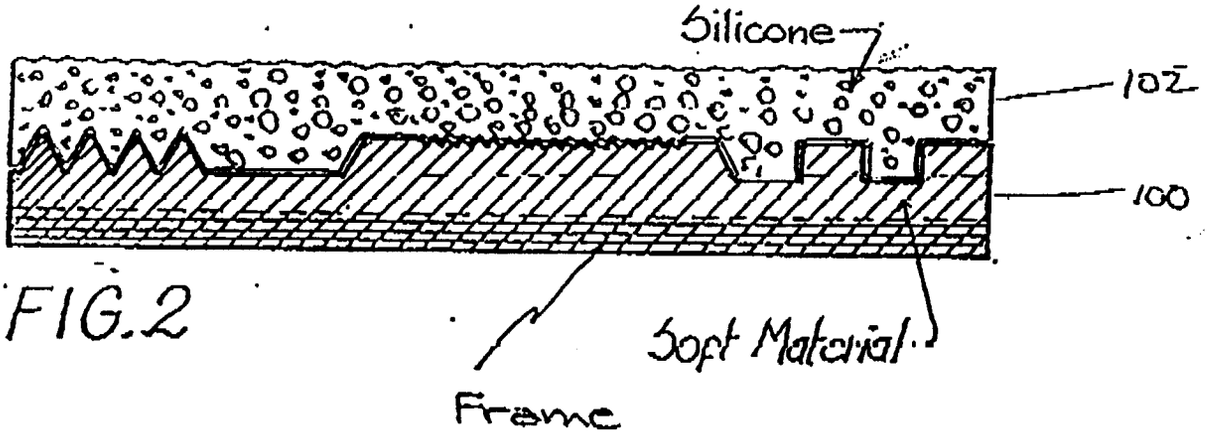

FIG.2

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BACKGROUND OF THE INVENTION

Art in all of its forms of expression is and has always been an integral part of mankind. Until the invention of lithography by A. Senefelder, in the 18th century, the reproduction of images, mainly religious, was performed by engraving artists who engraved wood and metal for later printing.

Metal engraving is classified into two main categories. The first is dry point. Dry point is an artistic printing process in which a perfectly flat, smooth and polished metal plate, preferably copper, is used. The artist engraves his drawing into the copper by means of exerting pressure on a cutting or carving tool. In this way, bores or indented lines are made in the copper which retain the ink or paint later used for printing a mirror image of the artist's creation.

Etching is the second category. Here, a wax film is applied to a perfectly polished copper surface. Again, with the use of a cutting or carving tool, the artist draws his creation in the wax without exercising the sort of pressure required in the dry point technique. In fact, the pressure used when writing with a pen or pencil on paper is about the level of pressure required in this instance. In making this drawing, the wax is removed at the points of pressure from the copper. Then a mixture of acids is poured over the wax-copper combination. The acid attacks the area where the wax has been removed and eats into the surface of the copper at these points. The acid does not attack the wax. Thereafter the wax is removed from the copper and ink is placed over the copper, the ink resting in the portions of the copper eroded away by the acid. Paper is then applied to the copper with ink and a mirror image print of the drawing originally made by the artist is made.

The inventor of U.S. Patent No. 4,166,092 and U.S. Application No. 07/489,134 which corresponds to Mexican Patent No. 153181 (both patents being incorporated herein by reference), discloses another method for forming a print of an artist's work. This print is not the mirror image of the original drawing but a replication thereof. It is the printing plate formed from the original drawing instead, which is the mirror image of the original drawing with the originally-drawn lines appearing as protrusions on the plate rather than indentations therein.

The present invention duplicates the result of dry point engraving but eliminates the difficulties the artist had to deal with in the past. The print which results from the present method is the mirror image of the original artistic creation, just as it is in dry point engraving.

Because the present invention produces a print which is essentially the same as that produced by dry point engraving, (yet eliminates the difficulties associated therewith), dry point engraving is discussed in greater detail.

The dry point process for engraving is the most basic and direct method used by an artist. As noted above, the artist must make his drawing in a copper plate by exerting pressure on a pointed tool. Line variation is achieved by placing more or less pressure on the tool and using a thicker or finer cutting tool. The difficulty in this process is, if a soft enough copper is used to facilitate the artist's ability to draw his or her design in the copper with fluidity, the plate will be too soft for later printing. This is because after engraving the drawing in the plate, the plate is covered with ink, a sheet of paper is placed thereover, and pressure is applied. If the copper is soft, the bores or indentations originally placed therein are rapidly flattened during the step of applying pressure. This causes each print to be less clear than the previous print, and the original drawing to be ultimately lost.

On the other hand, if a harder copper is used, the artist must make use of significantly greater pressure to render his or her drawing in the copper. This pressure restricts the fluidity of motion of the artist and thus prevents him from creating the ultimate work which he desires. Up until the present invention, a compromise was reached in which a copper was used that was harder than that desired by the artist but softer than that desired by the printer. The result was an artistic creation which was generally satisfactory to the artist and that provided approximately 15 prints with acceptable quality, although the detail of the drawing diminished with each print. This is why when an individual acquires a print of a renowned artist, it is important for him to find out what number of print it is. The lower the number is, the higher the quality the print is. As can be readily appreciated, in the field of dry point engraving, conflicting interests have to be served and until now, these interests have not been served to the satisfaction of the artist or the printer.

SUMMARY OF INVENTION

Disclosed herein is a method of making a dry point engraving comprising the steps of: providing a soft base in which an artist may readily and with a minimum amount of pressure make an artistic creation thereon; applying to the surface of the base on which the artistic creation has been made a composition which will take the same shape of the artistic creation and will be removable therefrom to present a mirror image thereof; separating the composition from the soft base, the composi-

tion presenting a mirror image of the artistic creation contained on the soft base; covering the surface of the composition which reflects the artistic creation of the soft base, with a film of electrically conductive material to create an electrically conductive surface while not altering the artistic creation; immersing the composition with the electrically conductive material into a electrolytic bath and plating with metal the surface of the composition coated with the electrically conductive material; removing the metal from the composition, the metal having in one side a duplication of the artistic creation made in the soft base.

DRAWINGS

The present invention will be better appreciated with reference to the following drawings.

Figure 1 discloses a sectional view of the soft material upon which an artistic drawing has been made.

Figure 2 discloses the soft material of figure 1 with an elastomer or curable liquid plastic layer poured thereover.

Figure 3 discloses the layer of elastomer or curable liquid plastic separated from the soft material.

Figure 4 discloses the layer of elastomer or curable liquid plastic with a conductive film thereon.

Figure 5 discloses a metal plate made from the embodiment in figure 4 and backed with a backing.

DETAILED DESCRIPTION OF THE INVENTION

The present invention involves a method for making a dry point engraving using an engraving material which is soft enough that the artist may freely express himself in it. It also involves a method for making a metal plate that contains the drawing of the artist and that is hard enough to produce excellent and numerous prints of the drawing.

The first step in this method is to prepare a composition of soft material in which the artist may freely make his artistic creation. Such material might be wax, plaster, putty, soft plastic, soft tar soap or any other soft medium. This medium must be able to accept the carvings of the artist using some tool without the artist having to exert more than a minimum amount of pressure. This material, of course, must not be so soft that after making a line, the material can be deformed or deforms naturally to destroy the line made. Accordingly, materials such as wax, soft plaster or soap are good examples of the types of materials which could be used. In such material, the artist may take an instrument with a slight point, apply a minimal amount of pressure, and make his drawing. The pressure necessary would be little more or the same as that required to render a drawing on paper with pen or pencil. Although if desired, more pressure may be applied. If the artist desires the background of the soft material to be other than flat, he may use a material that is bumpy in texture or that is textured or already has a pattern therein. Instead the artist may cause the material to have a bumpy texture through scraping, pounding, stamping or otherwise altering the surface of the material as discussed later in this description. Because the surface is soft and malleable, the artist is afforded the luxury of obtaining any sort of texture or picture he desires without exerting undue physical effort on his part. The soft material may be very thin such as 1/8" in thickness or very thick. It need only be so thick that the lines drawn by the artist in the material are held therein. Thus a thin film of wax on a block of wood, would provide the artist with the soft surface needed in which to render his drawing, while the wood would provide a base to support the wax. On the other hand, a tablet of wax would be equally good.

Figure 1 discloses a sectional view of such a material or base 100 with an artistic rendition shown therein. If desired, the soft material or base 100 may be held within a frame or on a backing.

After the artist has completed his work in the soft material or base 100, soft material or base 100 is placed in a frame of greater depth than soft material or base 100. A layer of elastomer, liquid plastic that is curable preferably at room temperature, silicon, or other similar material such as rubber is then poured over the surface of the soft material or base 100 in which the artist has placed his work. This layer should be poured to a depth of at least about 1/2" in thickness. Figure 2 depicts this step showing soft material or base 100 with silicon layer 102 thereon. It is important that the material that is used to pour over the soft material or base 100 be able to take on exactly or almost exactly the shape of the surface of the soft material which it covers, that the material does not alter that surface, and that the material can be readily separated readily from the surface without ruining the shape of the surface of base 100 that it has taken on. Silicon is such a material. If soft material or base 100 is wax, liquid silicon may be poured thereon without fear of melting the wax either during the pouring step or the curing step. Further, silicon has excellent dimensional stability over a wide range of temperatures. This is helpful in carrying out the method of this invention.

The silicon or other material comprising layer 102 is allowed to cure preferably at room temperature. If silicon 102 is used, one may place a backing on it to facilitate the silicon holding its shape. As those skilled in the art are well aware, silicon is

somewhat rubbery and flexible in nature and therefore, the backing assists the silicon in holding its shape once it is separated from soft material or base 100. The backing may also ease the operator in removing the silicon 102 from the base 100.

After layer 102 has cured, it is removed from soft material or base 100. If silicon is used, this is accomplished simply by peeling it away from base 100. Another material might be separated from base 100 by applying a temperature differential, heat, cold or by using a jarring action. Backings may be used with these materials if desirable.

As can be seen in figure 3, layer 102 now has a mirror image in one surface of the artistic work placed in the soft material or base 100 as shown in figure 1.

Once separated from soft material or base 100, layer 102 is then dusted or very thinly coated with an electrically conductive film 104. The film 104 must be thin enough and even enough to not perceivably change the artistic creation on layer 102. The surface of layer 102, at least where the artistic drawing is, must be completely covered with film 104. Such films are known to those skilled in the art and may include platinum, silver, gold, copper, graphite or other materials.

In Figure 4, layer 102 with its essentially same representation of the artistic work placed in the soft material or base 100, is shown with the electrically conductive film 104 thereover.

With the electrically conductive film 104 on layer 102, layer 102 is placed in a bath for electroplating of metals. Examples of only some metals which may be used are copper, zinc, silver, gold, and the transition metals. The metal is electroplated onto layer 102 in known fashion to those skilled in the art. If copper is used, a low voltage of 1 to 10 volts is applied for a period of approximately 12 to 24 hours to cause a thin layer of metal to be electrically deposited onto the electrically conductive film 104 which lies on top of the layer 102. Those skilled in the art are very familiar with electrodeposition techniques, and the voltages and times required for different metals. If copper is the desired metal, the bath will be comprised of an aqueous solution of sulfuric acid and copper sulfate. Layer 102 and film 104 are placed in this bath. After a layer of copper 106 or other metal of at least 1/64" thickness has been deposited on layer 102 with the electrically conductive film 104, the three layers, 102, 104, and 106 are removed from the electrodeposition bath. It is noted that the temperature of the bath in this example will reach approximately 90 degrees fahrenheit. The material of layer 102 must be chosen in view of the heat that this layer must tolerate in the bath. Layer 102 cannot be susceptible to deformation to a degree which will alter the artistic creation which it carries in its surface. In the foregoing example, silicon is a good choice as it does not deform significantly when exposed to such heat.

The metallic layer 106 which is formed on layer 102 with the electrically conductive film 104, now has on one surface an imprint of the original drawing shown in figure 1. This is because layer 106 has formed over the surface of layer 102 which contained this drawing. Layer 106 is also extremely hard. It is much harder than a metal which an artist could originally have used for engraving an artistic design. It is so hard, that this layer can be used to make prints of the drawing by standard printing means without concern that the layer will rapidly and perceptibly flatten as each subsequent print is made. This of course, is well known to those familiar with the art of electroplating. In electroplating, desired hardnesses of metals can be achieved by manipulating the chemicals, time, and voltages applied in the electroplating process.

Layers 102, 104, and 106 now removed from the bath, are next placed in a frame with the back side of metal layer 106 on the top. In this frame liquid resin, metal, glass, plastics, or other backing may be applied to the back side of metal layer 106 and allowed to harden. This will form backing layer 108. While backing layer 108 is preferable, it is not absolutely necessary and might be dispensed with altogether if metal layer 106 is made thicker than 1/64" or if it is not desired. Backing layer 108 is added to eliminate the amount of metal that is used in metal layer 106 and thereby reduce costs. It is also added to facilitate the ease of handling of metal layer 106 and to add to metal layer 106 a smooth, even, and hard surface.

With or without backing layer 108 added, layer 102 is next separated from metal layer 106, layer 102 pulling easily away therefrom if silicon is used. As noted above, metal layer 106 now carries the imprint of the drawing made in soft material or base 100. This is shown in figure 5.

Metal layer 106 and backing layer 108 are now ready for printing. The surface containing the artistic creation is cleaned to remove any debris and remains of conductive film 104. Ink is next placed thereon and metal layer 106 and backing layer 108 are placed in the printing press to make many more quality prints than 15. Because of the hardness of metal layer 106, it will not flatten noticeably while such prints are made. By using backing layer 108 or making metal layer 106 thick enough to provide its own backing layer, a smooth hard surface is available so that an even pressure may be applied by the printing press to metal layer 106 to create an even print therefrom. While such pressure is applied, any flaws or bumps in the printing

platen will be kept from contact with the underside of metal layer 106 near the original drawing, by backing layer 108.

Due to the use of soft material or base 100, the artist is able to freely and flowingly create his work. Due to the creation of hard metal layer 106, a larger than usual number of mirror image prints of the artistic drawing originally made in soft material or base 100 can be made. These prints will not or not perceptibly differ in quality. Thus, as can be seen, the present invention responds to the needs of both the printer and the artist. Further, the resulting product looks like a dry point etching without the disadvantages associated with such etchings having been present.

In conclusion the present invention relates to a printing process that replaces favorably the old process known as "dry point". In the present invention, the following method is taught. A surface plate 100 is prepared of a material that is soft but which will hold an engraving. An artist works in this material using minimum pressure to create his artistic work. After the artist has completed his work, a material such as liquid silicon 102 or similar elastomer composition 102 is poured over the surface of soft material or base 100 covering the finished work. The layer 102 is allowed to cure and solidify so that it takes on the surface condition of the soft material or base 100. Layer 102 is then separated from the soft material or base 100 and presents a mirror image of the work in soft material 100. Next, the surface of layer 102 with the mirror image of the original engraving is dusted or coated with a thin film of electrically conductive material. Because the film of electrically conductive material 104 is very thin, it does not perceivably affect the artistic rendition of the artist. It merely coats it. Once the surface of layer 102 ia covered with film 104, it is placed in a bath for electroplating of metal layer 106 thereon. After metal layer 106 is formed it is backed on its back surface with an epoxy resin or other backing material 108. Metal layer 106 is preferably made of copper. The metal layer 106 and backing layer 108 are then separated from layer 102. If layer 102 is silicon, this may be accomplished by pulling layer 102 away from metal layer 106. Metal layer 106 has to the naked eye, the same surface pattern of the surface of soft material or base 100 upon which the artist first worked. Layers 106 and 108 are now ready to be mounted on the platen of a printing press and inked or colored with paint to make a large number of prints of the artistic work originally placed in base 100. The variation in quality in these prints will be minimal throughout a much greater number of prints than was traditionally the case.

Many amendments may be made to the foregoing process to achieve different artistic results. Some of these are discussed below.

It may be that the artist wishes to create a print which reflects a dry point technique as well as at least one other technique. To attend to this, base 100 must reflect this desire. As an example and without limitation, the artist may wish to couple a chiseled engraving made in concrete or wood with his dry point engraving created in the fashion discussed herein, or couple a design placed in steel through application of chemicals and perhaps force with a dry point engraving according to the method described herein. In addition the artist may wish to reflect a collage. All of this is possible.

EXAMPLE 1

The creation is made in any medium, perhaps chiseled in concrete or wood or the pattern desired is made in steel. Perhaps thereafter a collage of materials is added to one of these mediums. When the desired look is accomplished, that is the base "artistic creation" is created, the surface of that creation is covered with a layer such as layer 102. That is, it is covered with a material that will take on essentially the exact shape of the artistic creation and separate easily therefrom. Again, silicon or rubber or the like are materials that would serve this purpose. Once this rubber-like layer has taken on essentially the exact shape of the surface of the artistic creation, it is separated therefrom. A material that can serve as base 100, such as wax, is poured over that portion of the rubber-like layer which has taken on the shape of the surface of the artistic creation and it then takes on essentially the exact shape of the surface of the artistic creation now reflected in the rubber-like layer. This wax or other similar material is then separated from the rubber-like layer and forms base 100 described in preceding paragraphs. It is ready for engraving pursuant to the method described herein and any other action the artist desires (such as painting, placing a collage thereon etc.). Following the engraving and any other steps desired by the artist, the steps discussed in the preceding paragraphs are followed. It is noted that the artistic creation may be placed in a frame before pouring the silicon or rubber-like material thereon. Further once the silicon or rubber-like material is separated from the artistic creation, it too may be placed in a frame so that the material for base 100 may be placed thereover. To summarize this example, the steps are as follows.

1) An artistic creation from any material is made.
2) A material is placed over this creation. This material must take on essentially the exact Shape of this creation and be easily separable

therefrom without destroying the shape of the surface of the artistic creation that it has taken on.

3) The material of step 2) is separated away from the artistic creation and now has a mirror image of that creation in its surface.

4) A material which can serve as base 100 described above is placed over the material of step 2) to take on the shape of the artistic creation the material of step 2) has in its surface.

5) The material of step 4) which is to form base 100 is separated from the material of step 2) and is available to the artist for etching. The artist may also wish to do more than etching such as place a collage thereon, paint the surface to have brush strokes thereon, etc.

6) The steps described in the preceding paragraphs are then followed. Those are: placing layer 102 on base 100, separating layer 102 from base 100, placing a film 104 on layer 102, placing layers 102 and 104 in an electrodeposition deposition bath to form a metal layer thereon, removing the metal layer to use for printing.

EXAMPLE 2

On the other hand, the artist may choose to omit the engraving step altogether and move instead directly onto the next step in which layer 102 is poured over the surface of base 100 and the above-mentioned process is completed with the portion of step 5) in the preceding example, the "engraving" in base 100 by light pressure by the artist being omitted.

EXAMPLE 3

Alternatively, if the artist no longer desires the effect of dry point engraving, then the artistic creation may become base 100, and base 100 may be made of any material and dealt with in any fashion. The steps 1) through 6) set forth in Example 1 above may then be significantly shortened to the following.

1) An artistic creation from any material is made. This creation will serve as base 100.

2) A material is placed over this creation. This material must take on essentially the exact shape of this creation and be easily separable therefrom without destroying the shape of the artistic creation that it has taken on. This material would be layer 102.

3) The material of step 2), layer 102, is separated away from the artistic creation, base 100, and now has a mirror image of that creation in its surface.

4) The steps described in the preceding paragraphs are then followed. Those are: placing a film 104 on layer 102, placing layers 102 and 104 in an electrodeposition bath to form a metal layer thereon, removing the metal layer to use for printing.

In this example, the end product will not be a mirror image of the artistic creation while in Example 2 above, it will.

EXAMPLE 4

Here again, it may be desired that the etching step be omitted and it may be desired that the final product not be a mirror image of the artistic creation. The steps may then be as follows.

1) An artistic creation from any material is made. (To reiterate, this means that one could make a concrete, wood, or steel etc. creation and use it directly, or use such a creation and through the initial process of Example 1 reflect that creation in a soft engravable base 100, or use that creation and reflect it in a soft engravable base and place a collage or other creation thereon, etc.)

2) A material is placed over this creation. This material must take on essentially the exact shape of this creation and be readily separable therefrom without destroying the shape of the artistic creation that it has taken on.

3) The material of step 2) is separated away from the artistic creation and now has a mirror image of that creation in its surface.

4) A material which can serve as base 100 described above is placed over the material of step 2) to take on the shape of the artistic creation the material of step 2) has in its surface. However, this material need not be so soft that engravings can be easily made therein. The material however must be able to be placed in an electroplating bath and not adversely react therein or react so as to destroy the artistic creation that has been formed in it. Wax is a suitable material.

5) The material of step 4) which is to form base 100, is separated from the material of step 2).

6) Film 104 is placed on the surface of base 100 described in the preceding step.

7) Film 104 and base 100 are placed in an electrodeposition bath to form a metal layer thereon.

8) The metal layer is removed to use for later printing.

It is readily understood by those skilled in the art that if the end product desired is to be a mirror image or a direct image of the creation, that steps can be added or deleted to the foregoing methods to create this end image (if the method does not already produce the desired end product).

Claims

1. The method of making a dry point engraving comprising the steps of:

providing a base having a surface, at least said surface being soft enough that a user applying pressure to said surface equivalent to that used when writing on paper with a pencil may place a pattern in said surface, said surface being firm enough to hold said pattern;

making a pattern in said surface;

applying to said surface of said base in which said pattern has been made a composition which will take the shape of said surface with said pattern and will be removable therefrom to present a mirror image of said surface and said pattern;

separating said composition from said surface, said composition presenting a mirror image of said surface and therefore of said pattern contained in said surface;

covering the surface of said composition which reflects said pattern in said surface of said base with a film of electrically conductive material, said covering step creating an electrically conductive surface over said surface of said composition which reflects said pattern, said covering step being applied so as not to alter said pattern in said composition;

immersing said composition with said electrically conductive material into an electrolytic bath and plating with metal the surface of said composition coated with said electrically conductive material; and

removing said metal from said composition, whereby said metal has in one side said pattern made in said surface of said base.

2. The method of any one of claims 1, 10, 14, 15, further comprising the step of backing said metal by attaching on the back surface of said metal opposite the side where said pattern appears a backing that will conform on one side to the back surface of said metal and on the other side will be flat.

3. The method of any one of the preceding claims wherein said composition is one of a curable mixture of resilient polymer, silicon, organic silicon oxide polymer.

4. The method of any one of claims 1, 14, or 15 wherein one of the transition metals is used in the electrolytic bath.

5. The method of any one of claims 1, 14, or 15 wherein a transition metal from the groups VIII B of the periodic table of the elements is used in the electrolytic bath.

6. The method of any one of claims 1, 14, or 15 wherein a transition metal from group II B of the periodic table of the elements is used in the electrolytic bath.

7. The method of claim 2 wherein the backing placed on said back surface of said metal is an epoxy resin which is poured onto said back surface of said metal and allowed to harden.

8. The method of any one of the preceding claims wherein in said providing step, said base is comprised of wax.

9. The method of any one of the preceding claims wherein the film of electrically conductive material is graphite.

10. The method of making a dry point engraving comprising the steps of:

providing a base made of wax, said wax having a surface which is so soft that an individual applying pressure thereon equivalent to that used when writing on paper may place a pattern in said surface, said surface being hard enough that said pattern will be held therein;

making a pattern in said surface;

applying to the surface of said wax in which said pattern has been made, a composition comprised of one of durable resilient polymer, silicon, organic silicon oxide polymer, said composition taking the shape of said surface with said pattern and being removable therefrom to present a mirror image of said surface with said pattern;

separating said composition from said surface, said composition now presenting the mirror image of the surface and the pattern contained in said surface;

covering the surface of said composition which contains said pattern with a film of graphite to create an electrically conductive surface while not altering said pattern;

immersing said composition with said graphite into an electrolytic bath and plating with metal the surface of said composition coated with said graphite; and

removing said metal from said composition, said metal thereby having in one side the pattern made in said surface.

11. The method of any one of the preceding claims wherein the surface of said base is generally smooth.

12. The method of any one of claims 1 through 10 wherein the surface of said base is not smooth.

13. A method of making an artistic print comprising the steps of:

creating an artistic creation in any material;

placing a material over said artistic creation, said material taking on the shape of said artistic creation and being removable therefrom with the shape of the artistic creation therein;

electroplating said material placed over said artistic creation to form a sheet of metal with said artistic creation therein;

separating said sheet of metal from said material which was placed over said artistic creation; and

making prints from said metal.

14. A method of making an artistic print comprising the steps of:

creating an artistic creation in any material;

placing a material over said artistic creation, said material taking on the shape of said artistic creation and being removable therefrom with the shape of the artistic creation therein;

adding on top of the surface of said material placed on said artistic creation which contains a replication of said artistic creation a second material which will take on the shape of said artistic creation replicated in said material placed on said creation, said second material being soft enough that a user applying pressure to said surface equivalent to that used when writing on paper with a pencil may place a pattern in said surface, said surface being firm enough to hold said pattern;

separating said second material from said material placed on said artistic creation so that said second material contains a replication of said artistic creation;

amending said second material so that it contains said replication of said artistic creation and additional matter;

electroplating said second material;

separating said sheet of metal from said second material; and

making prints from said metal.

15. The method of any one of claims 1,2, 4 through 9, 11 through 14 wherein said material placed over said artistic creation is one of elastomer, silicon, rubber, or a rubber-like material.

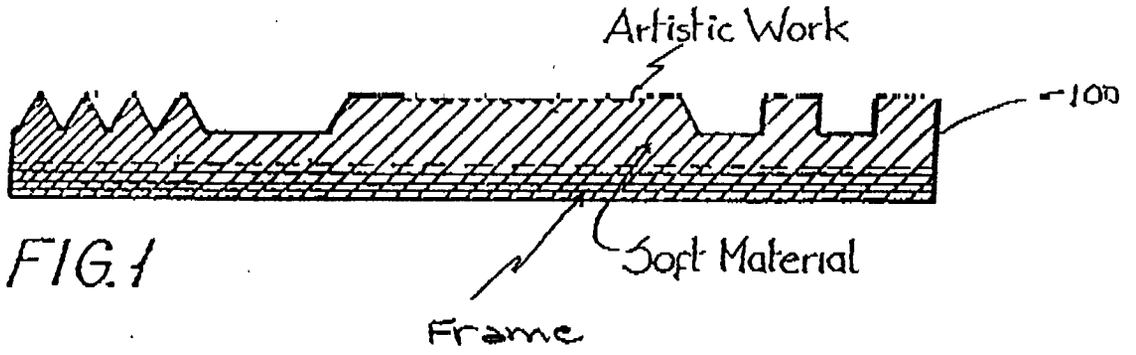

FIG. 1

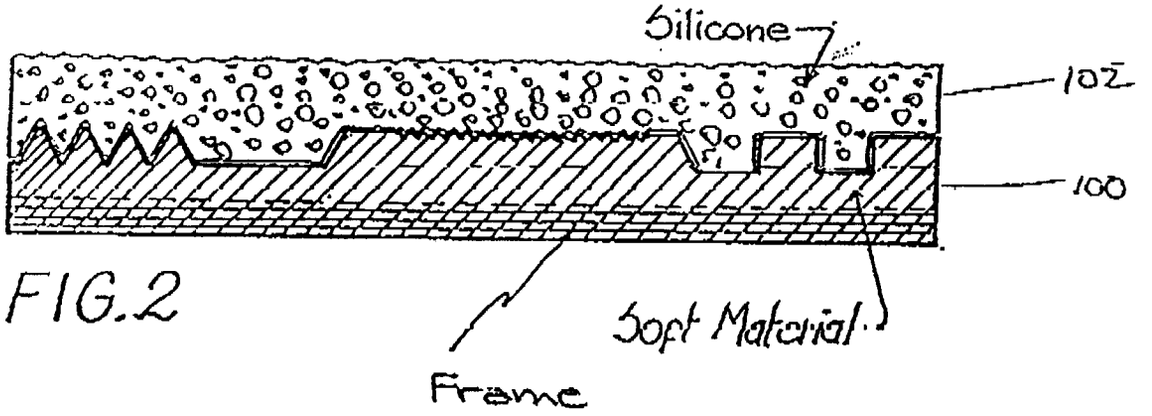

FIG. 2

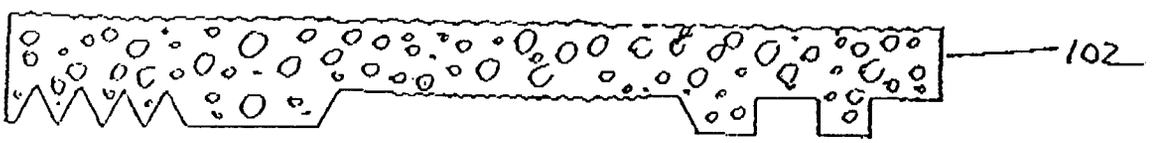

FIG. 3

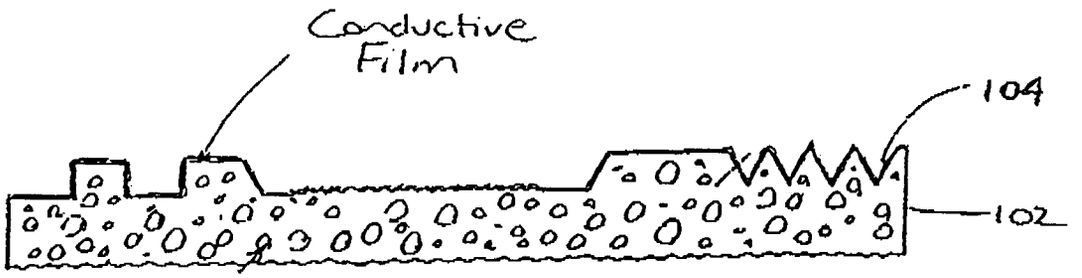

FIG. 4

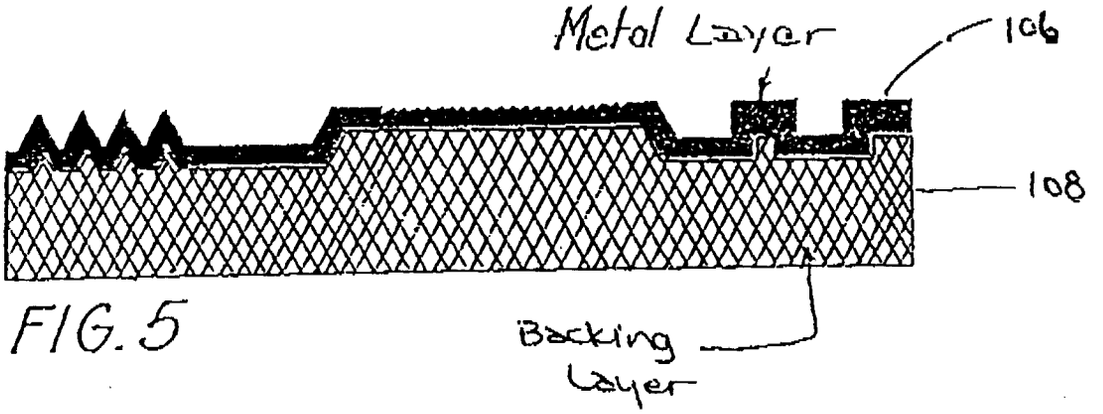

FIG. 5

European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 91 11 9088

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
P,X	US-A-5 013 409 (D. CZOR) * column 1, line 1 - column 8, line 2 *	1-5, 7-13, 15	C25D1/10 B44C1/22
D,Y	US-A-4 166 092 (L. REMBA-GRONDOVSKI) * the whole document *	1,3-5,8, 10,11, 13-15	
Y	DE-A-2 912 694 (P. MACK) * the whole document *	1,3-5,8, 10,11, 13-15	
A	EP-A-0 287 746 (W. BLÖSCH AG) * column 1, line 1 - column 2, line 48 *	1,4,13, 15	

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

B44C
C25D
B41N

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	07 FEBRUARY 1992	DOOLAN G.J.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
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