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(54) **Transfer material and method of coloring the surface of an object.**

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Description

This invention relates to a transfer material and to a method of coloring the surface of an object by transfer printing.

Transfer printing has been in wide use for coloring ceramic ware on a mass production basis. The technique of transfer printing employs a transfer material, which typically comprises a substrate or base, a design layer including a design to be transfer-printed and a layer interposed between the substrate and the design layer to enable separation of the design layer from the substrate and subsequent adhesion of the design layer to the surface of an object to be transfer-printed when transfer printing is conducted.

There are known three methods of coloring ceramic ware by using such transfer material as mentioned above.

One method (I) involves applying glaze on the surface of unglazed ceramic ware, firing the ware at about 1300°C, transfer printing a colored design on the glazed surface of the ware and again firing the ware at about 800°C to 1200°C. Another method (II) involves transfer printing a colored design on the surface of unglazed ceramic ware, firing the transfer-printed ware at about 500°C to 700°C, applying glaze on the colored surface of the ware and then firing the ware at about 1300°C. A third method (III) involves applying a mixture of glaze and synthetic resin on the surface of unglazed ceramic ware, transfer printing a colored design on the applied layer of the mixture, and then firing the ware at about 1300°C.

Among known types of transfer material that can be used in the above-mentioned methods of transfer printing, there is a type such that the material is moistened and swollen with water to render the design layer separable from the substrate, and manually applied to the surface of an object to be transfer-printed so that the design layer is transferred from the substrate to the surface of the object.

This type of transfer material, however, is not suitable for use in transfer printing on a mass production basis since it requires much manual labor. Moreover, this type of transfer material cannot be used in the above-mentioned methods (II) and (III) wherein the surface of the piece of ceramic ware is in such a condition as to absorb much water thereby to prevent transfer of the design layer from the substrate layer to the ceramic surface.

A transfer material particularly intended for use in the above-mentioned methods (II) and (III) has been proposed which comprises a sheet of Japanese paper as a substrate or base and a design layer formed thereon by the gravure process with ink for coloring ceramic ware, with a water-soluble resin used as a binder.

When the transfer material is pressed against the surface of an object to be transfer-printed, the material is moistened with water applied to the reverse side of the base sheet of paper so that the design layer is separated from the base sheet and transferred to the surface of the ceramic ware. This type of transfer material also requires much manual labor and it is quite difficult to effect complete transfer of the design layer and a considerable degree of skill is required if this type of transfer material is used on a curved surface.

Another type of transfer material disclosed in US—A—3 967 021 comprises a design layer including the design to be transfer-printed, two adhesive layers between which the design layer is laminated, and a substrate layer supporting the three laminated layers. The two adhesive layers are heat-sensitive and activatable to turn into a tacky state within two different temperature ranges, being substantially not tacky out of these temperature ranges. When the design is to be transferred to a transfer head, the transfer material is heated to a temperature within one of the two temperature ranges so that the upper adhesive layer is activated to cause the design layer to be transferred and bonded to the transfer pad, and when the design layer is to be transferred from the pad to an object to be transfer-printed, the temperature drops within the other of the temperature ranges so that the lower adhesive layer is activated to cause the design layer to be transferred from the pad surface to the surface of the object and to be bonded to the object surface.

To carry out the method disclosed in US—A—3 967 021 it is necessary that the two steps should be conducted either in two different chambers the temperatures inside which are maintained within the above-mentioned respective ranges, or separately, that is, first at a first temperature within one of the two temperature ranges and upon lapse of a predetermined period of time at a different temperature within the other of the temperature ranges. In either case, the method is time-consuming and not suitable for mass production.

EP—A—0 055 395 which is a publication in accordance with Art. 54(3) EPC, discloses a transfer material which has a first layer of thermoplastic wax-like material formed on a substrate, and a second layer of thermoplastic material formed on the first layer, with a design layer being formed on the said second layer. However, in this case, the heat-sensitive thermoplastic materials of said first and second layers have such a characteristic that they have different softening and melting points so that this requires two heating steps as in the case of US—A—3 967 021.

Accordingly, it is the object of the present invention to improve the transfer material described in the preamble of claim 1 in such a manner that a simpler and easier print transfer of a design on objects of different contours and shapes is possible in a single heating step by means of a transfer pad and to provide a method of coloring the surface of an object using said improved transfer material which is suitable for mass production.

This object is achieved by the transfer material with the features indicated in the characterizing portion of claim 1 and by the method with the steps indicated in the characterizing portion of claim 12, respectively.

Brief description of the drawing

Figs. 1 and 2 are schematic cross-sectional views of different forms of the transfer material of the invention; and

Figs. 3a through 3f are schematic cross-sectional views for explanation of a transfer printing method which uses the transfer material shown in Fig. 1.

Description of preferred embodiments

Referring to Fig. 1, a transfer material 1 is schematically shown in cross section and comprises a substrate 2, a first or lower layer 3 of thermoplastic wax-like material formed on the substrate 2, a second or upper layer 4 of thermoplastic material formed on the first thermoplastic layer 3, and a design layer 5 formed on the second thermoplastic layer 4.

The substrate 2 can be a sheet of paper of suitable quality such as coated paper, kraft paper, or a film of a suitable resinous material such as polyethylene terephthalate or the like resinous material. When a sheet of paper is used as the substrate, it may be thoroughly coated with a material that is both oil-resistant and water-resistant and has no affinity for the thermoplastic wax-like material. Such coating is useful in preventing expansion and shrinkage of the paper and infiltration of the wax-like material into the paper thereby to ensure proper and smooth separation of the first layer 3 from the substrate 2.

The thermoplastic wax-like material of the first layer 3 is a mixture of thermoplastic hydrocarbon resin or rosin as a chief component and wax such as metalized synthesized wax, oxidized modified wax made from montan wax, paraffin wax, microcrystalline wax, animal wax and plant wax, and wax copolymerized with ethylene. Mineral oil, animal oil and/or plant oil may be added to the mixture in order to adjust the softening point, the melting point and the fluidity or viscosity of the mixture, as well as to make easy application of the above-mentioned mixture on the substrate 2 to form the first thermoplastic layer 3 and subsequent formation of the second thermoplastic layer 4 and the design layer 5 thereon and to improve the printing characteristic of the resulting transfer material.

The softening point of the wax-like material of the first layer 3 is preferably between 55°C and 60°C and the melting point thereof is preferably between 85°C and 95°C although not restricted to the temperature ranges, with the difference between the softening and melting points being preferably between 25°C and 35°C.

The above-mentioned hydrocarbon resin suitable for use in the transfer material of the invention can be commercially obtained from Arakawa Chemical Co., Osaka, Japan and the above-mentioned metalized synthesized wax, oxidized modified wax and other waxes can be obtained from Hoechst Corporation, West Germany.

The material of the second thermoplastic layer 4 formed on the first thermoplastic layer 3 is a wax-like mixture of wax, oil and synthetic resin. Examples of the wax are metalized synthesized wax, oxidized modified wax, paraffin wax, animal wax and plant wax, which may be used either individually or in mixture. Examples of the oil are mineral oil, animal oil and plant oil, which may be used either individually or in mixture. Examples of the resin are thermoplastic hydrocarbon resins and ethylene copolymers, which may also be used either individually or in mixture. The wax-like mixture may be used in the form of emulsion.

Alternatively, the thermoplastic material of the second layer 4 may be composed of one or a mixture of two or more of thermoplastic latexes such as styrene-butadiene latex and nitrile-butadiene rubber latex; copolymer emulsions of thermoplastic resins such as alkyd emulsion, acrylic ester copolymer emulsion, ethylene-vinylacetate copolymer emulsion, acryl emulsion, and vinylchloride copolymer emulsion; hydrocarbon resin emulsion; and rosin emulsion.

The softening point of the material of the second thermoplastic layer 4 is preferably between 50°C and 55°C and the melting point thereof is preferably between 75°C and 85°C, though not restricted to the temperature ranges, with the difference between the softening and melting points being preferably between 20°C and 30°C.

The compositions of the materials of the first and second thermoplastic layers 3 and 4 are so selected that both the softening and melting points of the material of the second layer 4 are lower than those of the first layer 3. The difference in each of the softening and melting points between the materials of the first and second thermoplastic layers 3 and 4 is preferably between 5°C and 15°C though not restricted thereto.

The materials of the first and second thermoplastic layers 3 and 4 must be thermally decomposable when fired.

The compositions of the materials of the first and second thermoplastic layers are also so selected that the material of the first thermoplastic layer 3 has a higher adhesivity to an object to be transfer-printed than that of the second thermoplastic layer 4 to the pad of a transfer head to be described later.

The design layer 5 may be formed by offset, gravure, silk screen or any other suitable printing techniques with a suitable ink commonly used for printing and containing colorants, a binder, and other necessary component elements.

If necessary, an additional layer 6 of an elastomeric material such as urethane resin may be formed on or beneath the design layer 5 as shown in Fig. 2 to prevent distortion of the design layer when transfer printing is conducted. If the

design is delicate and complex, the proective layer 6 is particularly useful to maintain the original design in the course of transfer printing.

Referring now to Figs. 3a to 3f, a transfer printing method in which the transfer material shown in Fig. 1 is used will now be explained. First, a sheet 1 of the transfer material as prepared in the above-mentioned manner is provided. The sheet is then heated to such a temperature that the thermoplastic layers 3 and 4 are softened and become tacky. The dual-layer arrangement with the material of the first layer 3 having higher softening and melting points than those of the second layer 4 enables uniform softening and activation of the materials of the first and second layers and subsequent smooth separation of the layer 3 from the substrate 2 and proper adhesive application thereof to the surface of an object to be transfer-printed.

Any suitable device may be used for heating the sheet. A table 7 provided with an electric heater 8 may advantageously be used for the purpose since the next step of the method can immediately be taken on the heated sheet 1 on the table 7. A transfer head 9 is provided with a pad 9a made of a suitable resiliently deformable material such as silicone rubber and so contoured as to have a convexly curved surface 9b.

The head 9 is brought downwardly into contact with the upper surface of the heated sheet 1 of transfer material with a suitable pressure as shown in Fig. 3b, so that as the head 9 is raised, most of the thermoplastic layers 3 and 4 together with the design layer 5 and, if provided, the coating layer 6 are transfered to the surface 9b of the pad 9a as shown in Fig. 3c. Some of the thermoplastic material of the layer 3 is left on the substrate 2 as shown at 3'.

At the next step, the transfer head 9 with the design and said other layers on the surface of the pad 9a is brought into contact with the surface of a piece of ceramic ware 10 to be colored or transfer-printed with a suitable contact pressure as shown in Fig. 3d, so that as the head 9 is raised again, the design layer 5 and the thermoplastic layers 3 and 4 are transferred from the pad surface to the surface of the ceramic ware as shown in Fig. 3e with chiefly the adhesive wax-like material of the first layer 3 being in close contact with the surface of the ceramic ware.

Although the interface between the layers 3 and 4 is shown clear and sharp in Figs. 3c to 3e, actually it is not so clear and sharp because the materials of the two layers are mixed at the interface. In this connection, the substrate and the said layers are shown exaggerated in thickness for simplicity and clarity of illustration in all the figures.

As can be seen from the above, when the design layer 5 and the thermoplastic layers 3 and 4 of the transfer material are transferred from the substrate 2 thereof to the pad surface 9b of the transfer head 9, the layer 4 adheres more strongly to the pad surface 9b than the layer 3 adheres to the substrate 2, and when the layers are transferred from the pad surface to the surface of the ceramic ware 10, the layer 3 adheres more strongly to the surface of the ceramic ware than the layer 4 adheres to the pad surface. This is possible by proper selection of the materials of the substrate and the thermoplastic layers of the transfer material, and by the state of continuous tackiness of the activated thermoplastic layers.

At the next step of the method, the ceramic ware 10 with the transferred layers on the surface thereof is fired to such a temperature as to securely fix the design layer to the surface of the ceramic ware while simultaneously decomposing the thermoplastic materials of the layers 3 and 4 and removing the burned remnants from the surface of the object, so that the surface becomes clean with the design clearly transfer-printed thereon as shown in Fig. 3f.

Some preferred examples of the invention will now be given below for better understanding of the invention.

Example I

Coated paper weighing 128 g per square meter is used as the substrate sheet, on which a first layer of thermoplastic wax-like material and a second layer of thermoplastic material are successively formed one upon the other with mixtures of the following compositions.

Composition of the thermoplastic wax-like material of the first layer:

	Parts by weight
Hydrocarbon resin (Arukon, product of Arakawa Chemical Co., Osaka, Japan)	38
Metalized synthesized wax (Caw-20, product of Hoechst Co.)	8
Oxidized modified wax (KPE, product of Hoechst Co.)	12
Oxidized modified wax (R-21, product of Hoechst Co.)	4
Wax copolymerized with ethylene	8
Beeswax	4
Paraffin wax	16
White oil	10

Composition of the thermoplastic material of the second layer:

Hydrocarbon resin (Arukon)	16
Oxidized modified wax (KPE)	16
Wax copolymerized with ethylene	12
Castor wax	8
Beeswax	8
Paraffin wax	24
White oil	16

On the surface of the second thermoplastic layer thus formed a design layer is formed by the gravure process with an ink commonly used for coloring ceramic ware and containing inorganic pigments as chief components to produce a sheet of transfer material.

The sheet of transfer material is put on a heating plate heated to about 130°C, and a transfer head with a silicone rubber pad is pressed against the upper surface of the heated sheet of transfer material so that as the transfer head is removed therefrom the design layer and most of the thermoplastic layers are transferred to the pad surface of the transfer head.

The head is then pressed against the unglazed surface of a piece of ceramic ware so that the design layer and the thermoplastic layers arf transferred from the pad surface to the surface of the ceramic ware. After the ware is preliminarily fired at about 500°C, glaze is applied to the surface of the ceramic ware, which is then again fired at 1350°C. The ware has now been glazed, with the design having been clearly and securely transfer-printed on the surface thereof.

Example II

A sheet of transfer material is prepared in the same manner as in Example I by forming on a substrate sheet similar to that in Example I a first and a second thermoplastic layer successively one upon the other with mixtures of each of the following compositions.

Composition of the thermoplastic wax-like material of the first layer:

	Parts by weight
Hydrocarbon resin (Arukon)	40
Metalized synthesized wax (Caw-20)	2
Oxidized modified wax (KPE)	12
Oxidized modified wax (R-21)	5
Wax copolymerized with ethylene	14
Castor wax	2
Beeswax	3
Paraffin wax	14
White oil	8

Composition of the thermoplastic material of the second layer:

Hydrocarbon resin (Arukon)	12
Metalized synthesized wax (Caw-20)	8
Oxidized modified wax (KPE)	12
Wax copolymerized with ethylene	16
Castor wax	10
Beeswax	8
Paraffin wax	26
White oil	16

On the surface of the second thermoplastic layer thus formed a design layer having a delicate flower design is formed by screen printing with an ink commonly used for coloring ceramic ware and on the design layer there is formed a coating of elastomeric acrylic resin.

A piece of ceramic ware has its surface glazed and fired, and the sheet of transfer material prepared in the above-mentioned manner is applied to the glazed surface of the ceramic ware to transfer the design layer from the sheet of transfer material to the surface of the ceramic

ware, which is then fired at about 800°C so that the delicate flower design has now been transfer-printed on the glazed surface of the ceramic ware.

Claims

1. A transfer material comprising a substrate (2), a design layer (5) including a design to be transfer-printed onto an object (10), and a layer (3, 4) interposed between the substrate and the design layer to enable separation of the design layer from the substrate when said transfer material is heated and said design layer is picked up by a transfer head (9) to be used for transfer printing, and subsequent adhesion of the design layer onto the surface of the object by pressing said transfer head against said object, characterized in that said interposed layer comprises:

a first layer (3) of thermoplastic wax-like material formed on said substrate, and a second layer (4) of thermoplastic material formed on the first layer, with said design layer (5) being formed on the second layer, that the materials of said first and second layers are heat-sensitive and have such a characteristic that they are not tacky at room temperature but activatable upon heating to the same temperature to turn both into a tacky state in which said second layer adheres more strongly to the said transfer head than the said first layer adheres to said substrate and remain in said state for a predetermined period of time after said heating is terminated and solidify to effect complete adhesion upon lapse of said predetermined period of time, and that said materials are decomposable when heated above the temperature at which said materials are activated, the material of said first layer having a higher degree of adhesivity to an object to be transfer-printed than that of said material of said second layer to said transfer head.

2. The transfer material of claim 1, wherein said material of said first layer has a softening point between 55°C and 60°C and a melting point between 85°C and 95°C.

3. The transfer material of claim 2, wherein the difference between the softening and melting points of said material of said first layer is between 25°C and 35°C.

4. The transfer material of claim 1, wherein said material of said second layer has a softening point between 50°C and 55°C and a melting point between 75°C and 85°C.

5. The transfer material of claim 4, wherein the difference between the softening and melting points of said material of said second layer is between 20°C and 30°C.

6. The transfer material of claim 1, wherein the difference in the softening point between said materials of said first and second layers is between 5°C and 15°C.

7. The transfer material of claim 1, wherein the difference in the melting point between said materials of said first and second layers is between 5°C and 15°C.

8. The transfer material of claim 1, wherein said first layer comprises a mixture of thermoplastic resin, wax and oil.

9. The transfer material of claim 1, wherein said second layer comprises a mixture of thermoplastic resin, wax and oil.

10. The transfer material of claim 1, wherein said second layer comprises a member selected from the group consisting of thermoplastic latexes, copolymer emulsions of thermoplastic resins, hydrocarbon resin emulsion and rosin emulsion.

11. The transfer material of claim 1, wherein said second layer comprises a mixture of at least two members selected from the group consisting of thermoplastic latexes, copolymer emulsions of thermoplastic resins, hydrocarbon resin emulsion and rosin emulsion.

12. A method of coloring the surface of an object (10) comprising using a sheet of transfer material comprising a substrate (2), a design layer (5) including a design to be transfer-printed onto the object and a layer (3, 4) interposed between the substrate and the design layer to enable separation of the design layer from the substrate when said transfer material is heated and said design layer is picked up by a transfer head (9) to be used for transfer-printing, and subsequent adhesion of the design layer onto the surface of the object by pressing said transfer head against said object characterized in that a sheet of transfer material according to any one of the preceding claims is used, that said sheet is heated to a temperature at which both said first (3) and second (4) layers become tacky, and that the transfer pad (9a) of said transfer head is pressed against said design layer so that said design layer and said first and second layers are transferred to the surface (9b) of said pad, and that then said pad surface with said tranferred layers thereon is pressed against the surface of said object so that said design and thermoplastic layers are transferred from said pad surface to said surface of said object.

13. The method of claim 12, wherein said second step of heating is conducted by placing said sheet of transfer material on a heating member.

14. The method of claim 12, wherein said transfer pad is of a resiliently deformable material and said object has a curved surface, against which said pad with said design and thermoplastic layers is pressed.

Revendications

1. Matériau transfer comprenant un substrat (2), une couche à dessin (5) comprenant un dessin devant être imprimé par transfert sur ub objet (10), et une couche (3, 4) interposée entre le substrat et la couche à dessin pour permettre la séparation de la couche à dessin du substrat, lorsque l'on chauffe ledit matériau et que la couche à dessin est prélevée par une tête de transfert (9) à utiliser pour l'impression par

transfer, et l'adhérence subséquente de la couche à dessin à la surface de l'objet en appuyant la tête de transfert contre ledit objet, caractérisée en ce que ladite couche interposée comprend:

une première couche (3) de matière thermoplastique cireuse formée sur ledit substrat, et une seconde couche (4) de matière thermoplastique formée sur la première couche, ladite couche à dessin (5) étant formée sur la seconde couche, en ce que les matières de la première couche et de la seconde sont sensibles à la chaleur et ont pour caractéristique de ne pas être collantes à la température ambiante, mais de pouvoir être activées en étant chauffées à la même température pour passer toutes deux dans un état collant dans lequel la seconde couche adhère plus fortement à la tête de transfert que le première couche ne le fait audit substrat, et rester dans cet état pendant une période prédéterminée après l'achèvement dutit chauffage, et de se solidifier pour réaliser une adhérence complète lors de l'écoulement de ladite période prédéterminée, et en ce que lesdites matières sont décomposables lorsqu'elles sont chauffées au-dessus de la température à laquelle lesdites matières sont activées, la matière de la première couche ayant un plus fort degré d'adhérence à un objet à imprimer par transfert que la matière de la seconde couche à la tête de transfert.

2. Matériau selon la revendication 1, caractérisé en ce que ladite matière de la première couche a un point de ramollissement compris entre 55°C et 60°C, et un point de fusion compris entre 85°C et 95°C.

3. Matériau selon la revendication 2, dans lequel la différence entre le point de ramollissement et le point de fusion de ladite matière de la première couche est comprise entre 25°C et 35°C.

4. Matériau selon la revendication 1, dans lequel ladite matière de la seconde couche a un point de ramollissement compris entre 50°C et 55°C et un point de fusion compris entre 75°C et 85°C.

5. Matériau selon la revendication 4, dans lequel la différence entre le point de ramollissement et le point de fusion de la matière de la seconde couche est comprise entre 20°C et 30°C.

6. Matériau selon la revendication 1, dans lequel la différence de point de ramollissement entre les matières de la première couche et de la seconde est comprise entre 5°C et 15°C.

7. Matériau selon la revendication 1, dans lequel la différence de point de fusion entre les matières de la première couche et de la seconde est comprise entre 5°C et 15°C.

8. Matériau selon la revendication 1, dans lequel la première couche comprend un mélange de résine thermoplastique, de cire et d'huile.

9. Matériau selon la revendication 1, dans lequel la seconde couche comprend un mélange de résine thermoplastique, de cire et d'huile.

10. Matériau selon la revendication 1, dans lequel la seconde couche comprend un élément choisi dans le groupe comprenant les latex thermoplastiques, les émulsions copolyméres de résines thermoplastiques, une émulsion de résine hydrocarbonée et une émulsion de colophane.

11. Matériau selon la revendication 1, dans lequel la seconde couche comprend un mélange d'au moins deux éléments choisis dans le groupe comprenant les latex thermoplastiques, des ëmulsions dans des copolymères de résines thermoplastiques, une émulsion de résine hydrocarbonée et une émulsion de colopane.

12. Procédé de coloration de la surface d'un objet (10) consistant à utiliser une feuille de matière de transfert comprenant un substrat (2), une couche à dessin (5) comprenant un dessin à imprimer par transfert sur l'objet et une couche (3, 4) interposée entre le substrat et la couche à dessin pour permettre la séparation de la couche à dessin du substrate lorsque l'on chauffe ledit matériau de transfert et que ladite couche à dessin est prélevée par une tête de transfert (9) à utiliser pour l'impression par transfert, et l'adhérence subséquente de la couche à dessin à la surface de l'object en appuyant ladite tête de transfert contre l'objet, caractérisé en ce qu'on utilise une feuille de matière de report selon l'une des revendications précédentes, en ce que l'on chauffe ladite feuille à une température à laquelle la première couche (3), ainsi que la seconde couche (4), deviennent collantes, et en ce qu'on appuie le coussinet de transfert (9a) de la tête de transfert contre ladite couche à dessin, de sorte que ladite couche à dessin ainsi que la première et la seconde couches sont transportées à la surface (9b) dudit coussinet, et en ce qu'on appuie la surface de coussinet, sur laquelle se trouvent les couches transportées, contre la surface dudit objet, de sorte que les couches à dessin et thermoplastiques sont transportées de la surface du coussinet à la surface de l'objet.

13. Procédé selon la revendication 12, dans lequel l'on effectue la seconde étape de chauffage en plaçant la feuille de matériau de transfert sur un élément chauffant.

14. Procédé selon la revendication 12, dans lequel le coussinet de transfert est constitué par une matière élastiquement déformable, et en ce que l'objet a une surface incurvée contre laquelle on appuie ledit coussinet avec les couches à dessin et thermoplastiques.

Patentansprüche

1. Abziehbildermaterial mit einem Schichtträger (2), einer Musterschicht (5), die ein Muster enthält, das durch Abziehbilderdruck auf einen Gegenstand (10) aufgedruckt werden soll, und einer Schicht (3, 4), die zwischen den Schichtträger und die Musterschicht dazwischengebracht ist, um zu ermöglichen, daß die Musterschicht von dem Schichtträger getrennt wird, wenn das Abziehbildermaterial erwärmt und die Musterschicht von einem Abzieh- und Übertragungskopf (9) aufgenommen wird, um für den Abziehbilderdruck verwendet zu werden, und daß die Musterschicht dann aud die Oberfläche des Gegenstandes aufgeklebt wird, indem der Abzieh- und

Übertragungskopf gegen den Gegenstand gepreßt wird, dadurch gekennzeichnet,

daß die dazwischengebrachte Schicht aus einer ersten Schicht (3) aus thermoplastischem, wachsartigem Material, die auf dem Schichtträger gebildet ist, und einer zweiten Schicht (4) aus thermoplastischem Material, die auf der ersten Schicht gebildet ist, besteht, wobei die Musterschicht (5) auf der zweiten Schicht gebildet ist,

daß die Materialien der ersten und der zweiten Schicht wärmeempfindlich sind und die Eigenschaft haben, daß sie bei Raumtemperatur nicht klebrig sind, jedoch beim Erwärmen auf dieselbe Temperatur aktivierbar sind, so daß beide in einen Zustand der Kleibrigkeit übergehen, in dem die zweite Schicht fester an dem Abzieh- und Übertragungskopf anhaftet, als die erste Schicht an dem Schichtträger anhaftet, über einen festgelegten Zeitraum nach der Beendigung des Erwärmens in diesems Zustand bleiben und sich nach Ablauf des festgelegten Zeitraums verfestigen, um ein vollständiges Kleben zu bewirken,

une daß die erwähnten Materialien zersetzbar sind, wenn sie oberhalb der Temperatur, bei der die Materialien aktiviert werden, erwärmt werden,

wobei das Material der ersten Schicht ein Ausmaß des Haftvermögens an einem durch Abziehbilderdruck zu bedruckenden Gegenstand zeigt, das größer ist als das Ausmaß des Haftvermögen des Materials der zweiten Schicht an dem Abzieh- und Übertragungskopf.

2. Abziehbildermaterial nach Anspruch 1, bei dem das Material der ersten Schicht eine Erweichungstemperatur zwischen 55°C und 60°C und einen Schmelzpunkt zwischen 85°C und 95°C hat.

3. Abziehbildermaterial nach Anspruch 2, bei dem der Unterschied zwischen der Erweichungstemperatur und dem Schmelzpunkt des Materials der ersten Schicht 25°C bis 35°C beträgt.

4. Abziehbildermaterial nach Anspruch 1, bei dem das Material der zweiten Schicht eine Erweichungstemperatur zwischen 50°C und 55°C und einen Schmelzpunkt zwischen 75°C und 85°C hat.

5. Abziehbildermaterial nach Anspruch 4, bei dem der Unterschied zwischen der Erweichungstemperatur und dem Schmelzpunkt des Materials der zweiten Schicht 20°C bis 30°C beträgt.

6. Abziehbildermaterial nach Anspruch 1, bei dem der Unterschied zwischen den Erweichungstemperaturen der Materialien der ersten und der zweiten Schicht 5°C bis 15°C beträgt.

7. Abziehbildermaterial nach Anspruch 1, bei dem der Unterschied zwischen den Schmelzpunkten der Materialien der erfbsf und der zweiten Schicht 5°C bis 15°C beträgt.

8. Abzierbildermaterial nach Anspruch 1, bei dem die erste Schicht aus einer Mischung von thermoplastischem Harz, Wachs und Öl besteht.

9. Abziehbildermaterial nach Anspruch 1, bei dem die zweite Schicht aus einer Mischung von thermoplastischem Harz, Wachs und Öl besteht.

10. Abziehbildermaterial nach Anspruch 1, bei dem die zweite Schicht aus einem Bestandteil besteht, der aus der Gruppe ausgewählt ist, die aus Thermoplast-Latizes, Copolymer-Emulsionen thermoplastischer Harze, Kohlenwasserstoffharz-Emulsion und (Terpentin)harz-Emulsion besteht.

11. Abziehbildermaterial nach Anspruch 1, bei dem die zweite Schicht aus einer Mischung von mindestens zwei Bestandteilen besteht, die aus der Gruppe ausgewählt sind, die aus Thermoplast-Latizes, Copolymer-Emulsionen thermoplastischer Harze, Kohlenwasserstoffharz-Emulsion und Terpentin)harz-Emulsion besteht.

12. Verfahren zum Färben der Oberfläche eines Gegenstandes (10) unter Verwendung eines Blattes aus einem Abziehbildermaterial mit einem Schichtträger (2), einer Musterschicht (5), die eine Muster enthält, das durch Abziehbilderdruck auf den Gegenstand aufgedruckt werden soll, und einer Schicht (3, 4), die zwischen den Schichtträger und die Musterschicht dazwischengebracht ist, um zu ermöglichen, daß die Musterschicht von dem Schichtträger getrennt wird, wenn das Abziehbildermaterial erwärmt und die Musterschicht von einem Abzieh- und Übertragungskopf (9) aufgenommen wird, un für den Abziehbilderdruck verwendet zu werden, und daß die Musterschicht dann auf die Oberfläche des Gegenstandes aufgeklebt wird, indem der Abzieh- und Übertragungskopf gegen den Gegenstand gepreßt wird, dadurch gekennzeichnet, daß einBlatt aus einem Abziehbildermaterial nach einem der vorhergehenden Ansprüche verwendet wird, daß das Blatt auf eine Temperatur erwärmt wird, bei der die erste Schicht (3) und die zweite Schicht (4) kleibrig werden, daß das Abzieh- und Übertragungskissen (9a) des Abzieh- und Übertragungskopfes gegen die Musterschicht gepreßt wird, so daß die Musterschicht und die erste und die zweite Schicht auf die Oberfläche (9b) des Kissens übertragen werden, und daß die erwähnte Kissenoberfläche mit den darauf befindlichen übertragenen Schichten dann gegen die Oberfläche des Gegenstandes gepreßt wird, so daß die Musterschicht und die thermoplastischen Schichten von der Kissenoberfläche auf die Oberfläche des Gegenstandes übertragen werden.

13. Verfahren nach Anspruch 12, bei dev r erwähnte zweite Schritt des Erwärmens durchgeführt wird, indem das Blatt aus dem Abziehbildermaterial auf eine Heizeinrichtung aufgelegt wird.

14. Verfahren nach Anspruch 12, bei dem das erwähnte Abzieh- und Übertragungskissen aus einem elastisch verformaren Material besteht und der Gegenstand eine gekrümmte bzw. gewölbte Oberfläche hat, gegen die das Kissen mit der Musterschicht und den thermoplastischen Schichten gepreßt wird.

Fig. 1

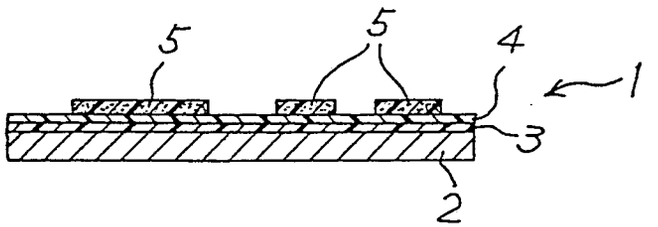


Fig. 2

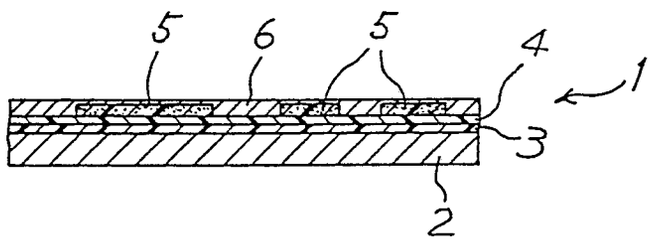


Fig. 3a

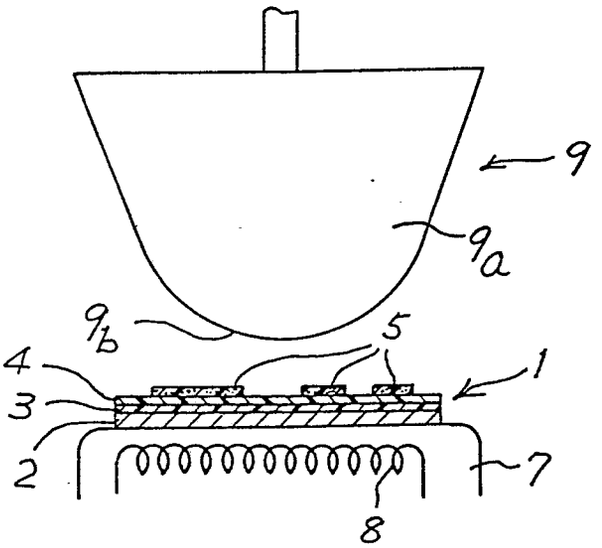


Fig. 3b

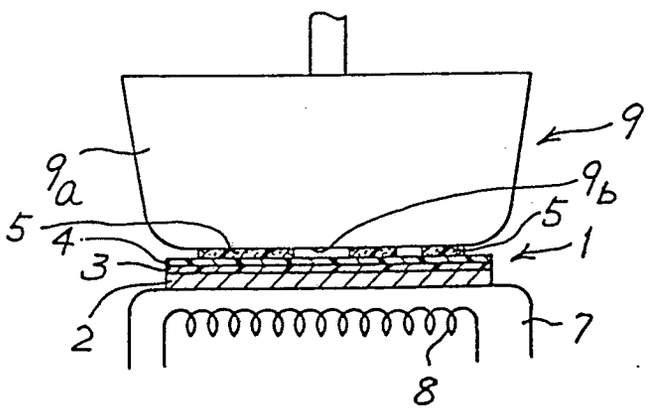


Fig. 3c

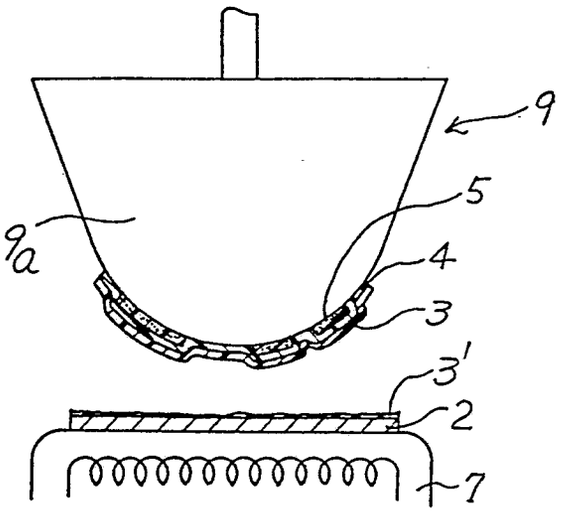


Fig. 3d

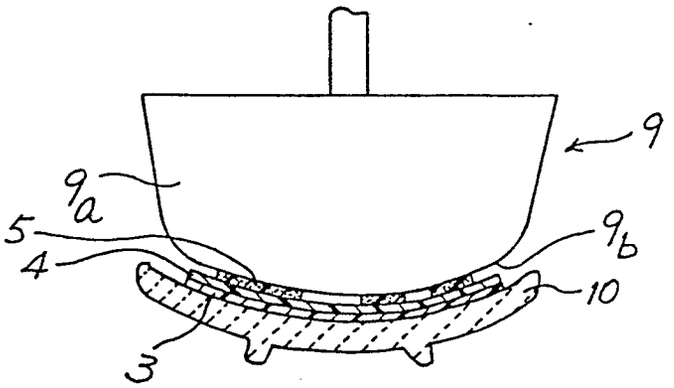


Fig. 3e

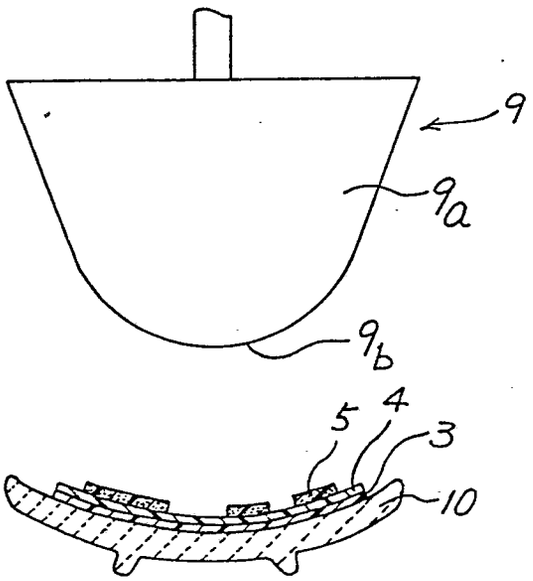


Fig. 3f

