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METHOD OF TRANSFERRING AND FIRING VISIBLE DESIGNS

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ABSTRACT OF THE DISCLOSURE

This invention relates to the transferring and firing of visible designs wherein a visible design, which upon burning becomes invisible, is transferred from a transfer sheet onto the surface of a fire resistant object to form an outline for coloring on the object, and, after coloring about the design on the object with fire resistant coloring matter, the object is fired so as to burn off the outline design and cause the same to disappear.

One of the most popular projects in the arts and crafts field is the coloring of ceramics. In this field, the ceramic or the like article is painted or otherwise colored using special, known ink formulations which, after firing of the ceramic remain more or less permanently in the ceramic body giving the same the design or pattern which was placed on the ceramic.

While most of the students and other enthusiasts in this field can color in outlines, they find it quite difficult to create their own designs either originally or by copying from some picture.

Accordingly, it is desirable to provide a method of transferring a design onto a ceramic body or a body of glass, metal, or the like, so that after transfer the outlined design can be colored as desired. This is not to be confused with the transfer of a decalcomania, which is now, commonly called "decal" wherein a complete design, which may be fully colored, is released from a release sheet on which it has been applied and pasted onto the surface to be designed. This type of proceeding is not suitable for the ceramic industry in general, and is not desirable in the arts and crafts field because it leaves nothing for the arts and crafts student or enthusiast to do after the transfer has been completed.

Attempts to provide transfer of outline designs or patterns onto a hard object such as a ceramic body have resulted in undesirable effects because the image transferred was always blurry. Furthermore, the transferred image always remained in the final product after the coloring of the interior, so that the final effect was not as agreeable in appearance as could be desired.

It is accordingly a primary object of the present invention to provide a method useful in the arts and crafts field and other fields whereby an outline design can be transferred from a predesigned sheet of, for example, paper, onto a hard object such as a ceramic body, and after coloring of the design, said outline can be made to disappear when the colored design is fired.

It is another object of the present invention to provide a special ink which can be transferred from a paper or other sheet material onto a hard surface without any blurring of the transferred design.

It is another object of the present invention to provide a method of transferring a design or pattern from a sheet onto the surface of a hard object whereby a complete transfer is effected without any blurring or smudging of the lines.

It is still another object of the present invention to provide designed sheets which can be used for effecting

transfer of the design from the sheet onto the surface of a hard object or the like.

Other objects and advantages of the present invention will be apparent from a further reading of the specification and of the appended claims.

With the above and other objects in view, the present invention mainly comprises the steps of transferring a visible design which upon burning becomes invisible from a transfer sheet onto the surface of a fire-resistant object, and after coloring of the design with fire-resistant coloring, firing the object so as to burn off the transferred design and cause the same to disappear.

In carrying out the method of this invention it is apparent that the ink used which is transferred from the transfer sheet onto the surface of the fire-resistant body should be one which burns off, at least the pigment should burn off leaving only an invisible residue, upon the firing of the body. The pigment should therefore preferably be an organic pigment such as victoria blue (phenyltetramethyltriamido - alpha - naphthyldiphenylcarbinol hydrochloride).

A particularly advantageous ink composition for the purposes of the present invention, and which also may be used as a ball point ink composition for direct making of designs either on transfer sheets or even directly on the ceramics is the following:

Ingredient	Parts
Tall oil alkyd	140
Dehydrated castor oil	200
"Terlon" 100% solid synthetic base	150
Victoria blue dry pigment	500
"Alrosol" wetting agent	015
Calcium carbonate	125
Talc	150
"Zirco" 6% zirconium drier	010
Cobalt drier 6% naphthenate	010
Eugenol U.S.P. technical grade	050
Total	1,350

All of the parts in the above formulation are by weight. The above ink formulation may, as indicated, be used as an ink for ball point pens, and it may also be used for forming the desired design or pattern by offset printing, letter press printing, stamping, simple drawing, or the like.

In the above particular formulation of an ink according to the present invention, it is possible to vary the proportions of each of the indicated ingredients by 20% in either direction, i.e. by $\pm 20\%$.

The ink formulation of the present invention has been found to be particularly effective for application to a sheet of paper or the like and subsequent transfer from the paper sheet onto any reasonably smooth surface, e.g. onto other paper, cardboard, wood, greenware (unfired ceramics), bisque (first fired ceramics), glazed and fired ceramics, plastic sheets or bottles, metal, such as tin trays, copper items, wooden articles, tiles, textiles, plaster walls, etc.

In order to be able to transfer the design or pattern from the transfer sheet onto the surface of the item to be designed, e.g. onto a ceramic body or the like, it is first necessary to treat the transfer sheet with a design thereon so as to release the design and enable transfer thereof.

The releasing of the design from the transfer sheet is accomplished by immersion of the transfer sheet for a short time in a liquid medium which will have the effect of breaking the bond of the inked design from the transfer sheet.

After the immersion in the liquid, the excess liquid is permitted to drain off, the transfer sheet is dried, for example by padding on a towel or by fanning in air, and then the practically dried pattern is applied to the desired area. The pattern does not smear or blur and does not transfer until a light pressure is applied on the back of the transfer sheet, for example by means of a spoon, the end of a lipstick case, the head of a thumbtack, or any similar means.

According to a preferred embodiment of the invention the pattern is applied to a transparent transfer sheet so that when the transfer sheet is placed against the surface onto which the pattern is to be transferred, and a light pressure is applied to the back of the transfer sheet, it is possible to see the pattern through the sheet so that one can be certain that a complete transfer is being made.

For release of the ink from the transfer sheet in order to enable transfer of the pattern or design from the transfer sheet onto the object to be designed, it is advantageous to immerse the transfer sheet for a short time in an aqueous solution of an alkali metal or ammonium sulfite. For reasons of economy and ready availability, the most preferred sulfite is sodium sulfite.

Another suitable means of releasing the design or pattern from the transfer sheet is to first immerse the transfer sheet with a design or pattern thereon in an aqueous slightly alkaline solution and then to immerse the same in an aqueous slightly acid solution. In this connection it is advantageous to use as the alkaline solution an alkaline bicarbonate or carbonate, e.g. sodium carbonate, sodium bicarbonate, potassium carbonate, potassium bicarbonate, ammonium carbonate, ammonium bicarbonate, etc. to which these may advantageously be added a soap such as ordinary U.S.P. green soap.

As the acid solution there is advantageously used dilute acetic acid, e.g. ordinary household vinegar.

By providing outline patterns which can be transferred from the transfer sheet onto the particular article on which the design is to be applied, particularly onto a fire-resistant article such as a ceramic article so that the outline really forms a design for guiding the hand of the arts and crafts student or enthusiast, the person doing the coloring can express his individual personality because, although the outline design is the same, each person's brush strokes are different and the colors can be selected as desired, so that with many different people using the very same design, the resulting design will always be different. This is a great advantage as a teaching guide, as well as in giving pleasure to the user. Moreover, since the subsequent firing of the colored in or painted in design can, according to the present invention, result in burning off or disappearance of the outline design applied from the transfer sheet, the final product does not have the stilted appearance of the "paint by numbers" type of painting.

It is preferred according to the present invention that the transfer sheet be a non-absorbent type of paper so that the pattern which is printed thereon is not absorbed by the transfer sheet but is readily releasable therefrom. It is a further embodiment of the present invention that after the design is applied to the transfer sheet, e.g. by printing or the like, the transfer sheet should be covered with a thin protective sheet, e.g. of polyethylene, in order to protect the ink design and prevent deterioration thereof by the atmosphere.

In carrying out the method of the present invention it should be noted that after the design or pattern is loosened from the transfer sheet, e.g. by immersing of the sheet in aqueous sodium sulfite solution or some other medium such as first in aqueous sodium bicarbonate followed by immersion in acetic acid, the transfer sheet should be fairly thoroughly dried before applying the same to the article on which the design is to appear, for example on the ceramic article. The actual transfer is then effected by applying pressure, e.g. by "burnishing" on the back of the transfer sheet while the same is in contact with the ceramic article surface.

While the invention has been described in particular with respect to the application of designs to hard surfaces such as those of ceramic and the like, it is to be understood that variations and modifications of the invention can be made without departing from the spirit of the invention. Accordingly also such variations and modifications are meant to be comprehended within the meaning and scope of equivalents of the appended claims.

I claim:

1. The method which comprises transferring a visible design, which upon burning becomes invisible, from a transfer sheet onto the surface of a fire-resistant object so as to form an outline design for coloring on said object; and, after coloring about said design on said object with fire-resistant coloring matter, firing the object so as to burn off the outline design and cause the same to disappear.

2. Method according to claim 1 in which the pigment of the ink is an organic pigment.

3. Method according to claim 2 in which said pigment is victoria blue.

4. The method which comprises forming a design on a transfer sheet with an ink which becomes invisible upon burning and which can be loosened from said transfer sheet by immersion in a liquid; immersing the thus designed transfer sheet in a liquid so as to loosen the inked design thereon; drying the thus treated transfer sheet; placing the inked design face of said transfer sheet against another object which is fire-resistant; transferring the design from said transfer sheet onto said other object by applying pressure on the back of said transfer sheet against said other object; and after coloring about said design on said other object with fire-resistant coloring matter, firing said other object so as to burn off the design transferred thereon.

5. Method according to claim 4 in which the pigment of the ink is an organic pigment.

6. Method according to claim 5 in which said pigment is victoria blue.

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