July 31, 1934. W. S. LAWRENCE 1,968,083

TRANSFER

Filed Oct. 12, 1931

Fig:1

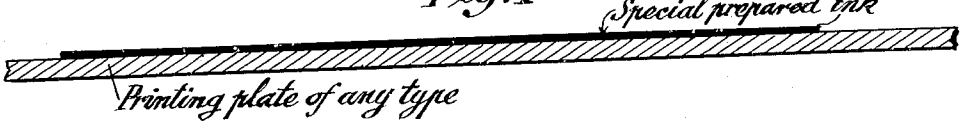



Fig:2.

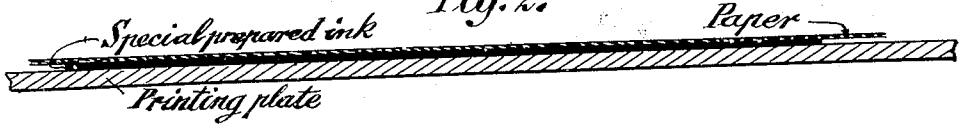



Fig:3.

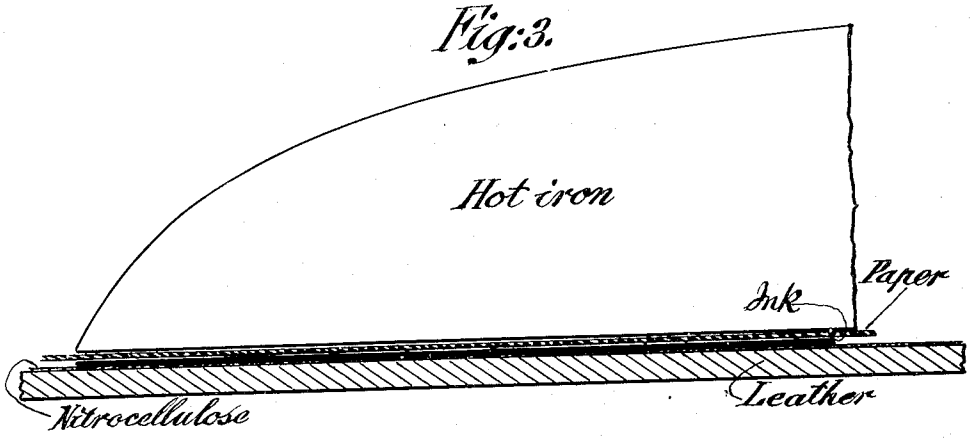



Fig:4.

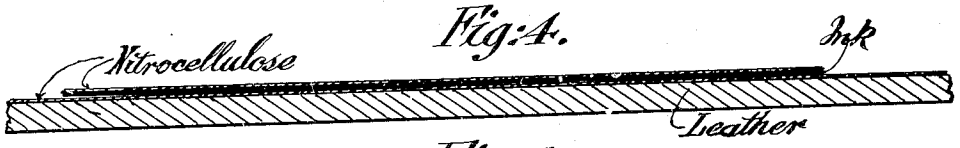
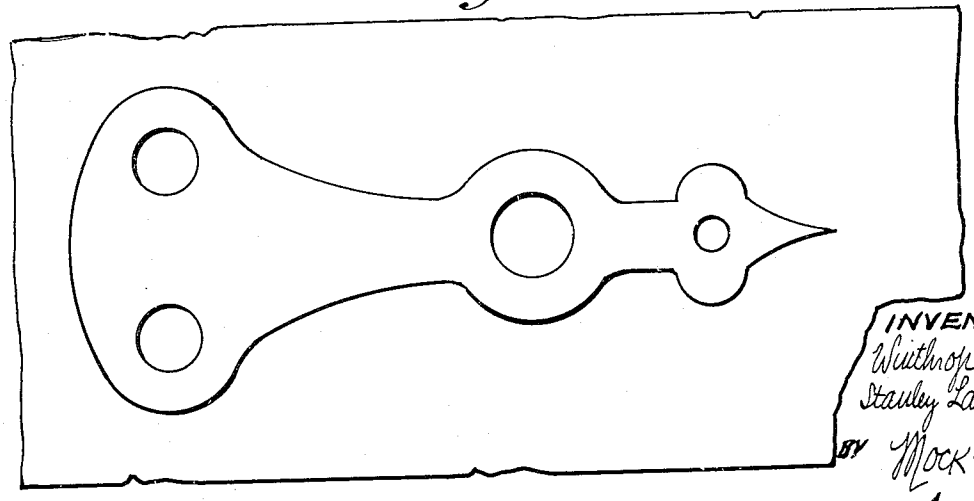



Fig:5.



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Patented July 31, 1934 1,968,083

# UNITED STATES PATENT OFFICE

1,968,083

## TRANSFER

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Application October 12, 1931, Serial No. 568,531

6 Claims. (Cl. 41—33)

My invention relates to a new and improved transfer.

One of the objects of my invention is to provide a new and improved transfer of the type which is applied by means of heat and pressure.

Another object of my invention is to provide a type of transfer which shall be especially suitable for decorating leather.

Another object of my invention is to provide a transfer of this type in which the marking composition is of a special type so that under suitable temperature and pressure conditions, the ink will be taken up by the coated surface of the leather, without diminishing or diluting the clearness and strength of the marking, and without any danger of bleeding.

Another object of my invention is to provide a transfer having a marking composition, which contains a large amount of infusible pigment or the like, the marking composition also containing suitable other ingredients so that the paper base of the transfer can be directly printed upon by lithography. It is a particular advantage of my invention that the paper base of the transfer can be printed by means of an ordinary printing plate, or by means of lithography, so that it is unnecessary to use the intaglio printing rollers of the prior art, and it is likewise unnecessary to use a fusible powder for dusting the markings which have been secured by means of lithography or the use of an ordinary printing plate.

This application is in part a continuation of my application Ser. No. 548,029 filed on June 30th, 1931.

Other objects of my invention will be set forth in the following description which illustrates a preferred embodiment thereof, it being understood that the above statement of the objects of my invention is intended to generally explain the same without limiting it in any manner.

It has been proposed for a number of years to decorate ordinary calf-skin or other leather so as to imitate reptile skins and other fancy leathers, and in such former process a decalcomania was employed. In decalcomania processes, a paper base is used and this has a water-soluble coating bearing the design to be duplicated. The use of the ordinary decalcomania is objectionable, because it is necessary to moisten the decalcomania in order to apply the design and to subsequently strip the paper from the design, and the process is slow and uncertain.

According to my invention any suitable paper base is printed upon by means of an improved composition, and this printing can be accomplished by means of an ordinary printing press or lithographic press, or by means of a printing plate of any type, without the necessity of afterwards sprinkling the moist printed marking with a fusible dusting powder.

In order to make my improved transfer it is not necessary to coat the paper base of the transfer, and I may use any suitable relatively impervious paper, such as a paper made from hydrated stock. When the transfer is applied by means of heat and pressure, it is necessary that the printing composition should be of the type which is readily absorbed by the surface of the leather so that little or no ink remains upon the paper base. However, the absorption of the ink by the leather must be controlled because a leather is ordinarily finished with a white or tan-colored base coat upon which the transfer marking must be impressed. This base coat consists of nitrocellulose and pigment in about equal proportions and it is applied to the surface of the leather in order to conceal imperfections. This base coat readily absorbs ink and the ink must therefore be of such composition as to prevent excessive absorption, or otherwise the relatively light color of the base could dilute the impression to such an extent as to make it non-commercial. It is preferable to use a base coat which is relatively porous and which can readily absorb an ink or the like. After the marking has been impressed upon the base coat, it is necessary to apply a finishing coat which also consists largely of nitrocellulose material. If the base coat is relatively non-porous, a firm union between the base coat and the finishing coat is not secured, which is a decided disadvantage. Hence, while I do not wish to exclude the application of my invention to a leather having a relatively non-porous base coat, it is a decided advantage that the improved transfer can be applied to a leather having a relatively porous base coat, to which the finishing coat can be firmly united.

The improved printing composition by means of which the mark is impressed upon the paper, should have a large excess of dyestuff, in order to compensate for the loss of color which results from the process of offset lithography, and to also compensate for the loss of color when the marking is transferred from the paper base to the leather. I prefer to use an offset lithographic press instead of a flat-bed lithographic press, because offset lithography is much superior in reproducing fine details of ornamentation. However, in utilizing the process of offset lithography, there are three transfers of ink and three resultant

losses in color, namely, from the plate to the offset roller, from the offset roller to the paper base of the transfer, and then from the paper base of the transfer to the leather or other material which is being marked.

The annexed drawing diagrammatically illustrates the invention herein.

Fig. 1 shows how the special ink is applied to a printing plate of any type.

Fig. 2 shows how the inked plate is applied to the paper base of the transfer.

Fig. 3 shows how the ink or transfer side of the paper base is applied to a sheet of leather which has a nitrocellulose coating.

Fig. 4 illustrates how the finished coating of nitrocellulose material is applied to the marked leather.

Fig. 5 illustrates a conventional design which may be applied to the leather.

While I do not wish to limit myself to the materials or proportions specified herein, a practical example of the formula for the improved transfer ink is as follows, the proportions being by weight:—

| | Parts |
|---|---|
| Gum dammar | 70 |
| Castor oil | 20 |
| Ordinary commercial kerosene | 40 |
| Boiled linseed oil | 20 |
| Nigrosine base | 50 |
| Carbon black | 40 |

The boiled linseed oil which is referred to in the practical example is the well known boiled oil which is used in making lithographic inks. The linseed oil which I prefer to use is thickened or boiled to an extent less than No. 00. However, I do not exclude the use of No. 00 boiled linseed oil. Likewise, the formula above mentioned may be modified by greatly increasing the proportion of nigrosine base or other dyestuff. For example, I may utilize 100 parts of nigrosine base in the above mentioned formula, instead of only using 50 parts.

The nigrosine base is utilized in order to produce a black color for marking upon the leather and it may be replaced by any oil-soluble black dye having a jet undertone.

The above mentioned formula is adapted to produce a black marking upon a white-colored base coating, as this is the most difficult color effect or contrast to secure. If a different color effect is desired, such as brown on white, for example, I may use a pigment or toner instead of the dyestuff. The expression "toner" is intended to refer to a combination of a dye with a metal, or to a chemical complex which includes a dye and a metal.

Likewise, if a blue color is desired, the nigrosine base can be replaced by any oil-soluble blue dye, and the color effects obtainable can be thus varied as desired.

The castor oil and the boiled linseed oil serve to reduce the melting point of the gum dammar, so that the composition will transfer at about 190° F.

In order to prepare the improved printing composition, the gum dammar is melted, the castor oil and the boiled linseed oil are thoroughly intermixed with the melted gum dammar and the mixture is then allowed to cool somewhat below the boiling point of the kerosene. The kerosene is now added to the cooled mixture and then the dye is stirred in and the carbon black is then added in order to give the composition sufficient body for printing. The mixture is then allowed to set and the mixture is then ground very finely.

The combination of the gum dammar and the oils above mentioned (but without the kerosene) would yield an ink which would be semi-solid at room temperature. However, the addition of a substantial proportion of kerosene, as previously noted, reduces the composition to a liquid state so that it can be used as a printing ink in an offset lithographic press.

When the impression is printed upon the paper base of the transfer, the kerosene evaporates quite rapidly, leaving the film of oils and gum dammar and the pigment and the dye, on the paper base of the transfer in a relatively dry condition.

The use of kerosene in such high proportions makes it possible to produce a final dry marking on the paper base which has a very high color effect, due to the very large proportion of pigment and dye. The oil-soluble dye may dissolve partly in the castor oil and in the boiled linseed oil, but the use of a large proportion of kerosene is necessary in order to carry enough dye so as to greatly increase the color effect of the printing composition. Likewise, the large proportion of kerosene provides a vehicle which permits the incorporation of a large percentage of carbon black or other pigment, and it likewise permits the use of a large proportion of the oil-soluble dyestuff.

It is to be understood that the dystuff is dissolved in the gum dammar and in the castor oil and boiled linseed oil and kerosene, so that this mixture serves as a vehicle for dispersing the dyestuff, but the proportion of dyestuff is so large that only about 20% is actually dissolved in the vehicle. The remainder of the dyestuff is dispersed in the form of fine solid particles in the vehicle, so that about 80% of the dyestuff acts somewhat like an ordinary insoluble pigment. This produces a much more intense color effect than by loading the composition with carbon black.

The high percentage of undissolved dyestuff and/or mineral or other type of pigment also decreases the penetration power of the composition, so that it penetrates the base coat of the leather to the proper extent and without too much dilution of the color.

As previously pointed out, the composition must penetrate the base coat of the leather to an extent sufficient to produce the marking, but excessive penetration is objectionable.

The transfer can be made by means of a heated flat press or by means of a heated embossing press. The embossing press is maintained at a temperature of about 190° F. and it is operated under high pressure, as for example about eight tons per square inch. If the transfer is larger than the plate of the embossing press, the transfer is applied in sections. The transfer is thus applied to the leather or other material by means of heat and pressure and the transfer and the material are then allowed to cool. The paper base of the transfer can then be readily stripped, as the ink has then little or no adherence to said paper base. Hence, the improved dry transfer can be used like a decalcomania while eliminating the necessity of moistening the paper base.

Instead of using surface printing for applying the composition to the paper base, I may also use an intaglio process for this purpose.

The intaglio process enables more ink to be applied to the paper base of the transfer. Hence, I prefer to use the following formula which is

less penetrating than the formula previously specified, and which readily strips from the paper base, when the paper base is cold. The heat and pressure serve to cause the ink to penetrate and adhere to the coating of the leather, so that the paper base can be readily stripped when it is cold.

The second formula is made up as follows, the proportions being by weight:—

45 parts of lindol (tri-cresyl phosphate)
25 parts of castor oil
20 parts of ethyl cellulose, this being sometimes referred to in the trade as "ethylated cellulose".

| | Parts |
|---|---|
| Gum dammar | 60 |
| Canauba wax | 15 |
| Ethyl acetate | 250 |
| Carbon black | 100 |
| Prussian blue | 25 |

It will be noted that the above mentioned composition contains two pigments, namely, carbon black and Prussian blue. A dyestuff may also be added, but the use of the dyestuff is not necessary, because there is no loss of color in the intaglio process and the intaglio process permits a relatively thick film of marking composition to be impressed upon the paper base of the transfer, so that there is little or no loss of color when the transfer is made.

Another advantage of the use of the improved composition is that it is possible to use an etched plate for the lithographic impression, so that more ink can be applied to the paper than in the use of the ordinary lithographic plate. This type of etched plate is much deeper and is more intaglio in character than the ordinary etched plate. Hence, while the process is basically lithographic, it is more intaglio printing than surface printing. The ink is pulled out from the deeply etched plate by means of the rubber blanket roll.

A particular advantage in using an uncoated paper, upon which the impression is directly printed is that the transfer may be made by an embossing press, thus saving an operation. If a coated paper is utilized, an embossing press weakens it to such an extent as to make it difficult to strip the paper in a satisfactory manner.

I do not wish to be limited to the above mentioned formulas or either of them. For example, I can eliminate the carbon black, and I can use nigrosine base or other suitable dyestuff exclusively. I may also use pigments having any desired color, such as blue, brown, yellow, or green.

One of the characteristics of the invention is to increase the color value of the ink so as to make suitable allowance for the losses in the printing and impression stages.

Another characteristic of the invention is the use of a high percentage of volatile solvent (such as kerosene), so as to leave a residual dry film which is unusually high in color value.

Another characteristic of the invention is the use of a combination vehicle for the dye or pigment so as to produce a composition which remains transferable for a long period of time. Likewise, the composition adheres very strongly to the lacquer or base coat. Likewise, the ingredients of the composition are of the type which can be readily combined with a nitrocellulose film. For example, the gum dammar could be used as a plasticizer and generally speaking, the compositions are of a type which can be readily incorporated with a nitrocellulose lacquer.

Another characteristic of the invention is the use of a relatively impervious paper for making the base of the transfer so that the paper base of the transfer will not absorb the ink unduly, and the ink can be readily released at a temperature of about 190° F., together with the simultaneous use of great pressure.

When the finishing coat is applied to the decorated surface of the leather, the impressed marking enters or combines with the finishing coating because the ingredients specified in the previously mentioned formulas are compatible with nitrocellulose lacquer material.

It is to be noted that the dyestuffs previously mentioned do not sublime at the temperature at which the transfer is effected, so that the dyestuff is directly transferred without any change in its physical condition when the vehicle becomes soft and tacky.

While the invention is of particular value as applied to the decoration of leather, it is not necessarily restricted to this particular purpose.

It will be noted that the marking which is impressed upon the paper base of the transfer is of such composition that the marking becomes tacky when suitably heated, and the marking can then penetrate a nitrocellulose coating under the influence of suitable pressure. When the transfer is allowed to cool after the marking has penetrated the nitrocellulose coating, the paper base can be readily stripped from the marking, as the marking then has greater adherence to the nitrocellulose coating than to the paper base. Indeed, the use of the improved composition results in practically destroying the adherence between the paper base and the transfer marking, so that it is very easy to remove the paper base after the marking has been transferred.

It will also be noted that the marking composition does not include solid particles of bronze or other metals which would dilute the coloring material (such as the dye or pigment), and which would lessen the penetrating power of the marking composition with respect to the nitrocellulose coating. However, I do not wish to exclude the use of metal particles in the marking composition. It is to be understood that even when the nitrocellulose coating is relatively non-porous, there is still some penetration of the marking composition in said nitrocellulose coating.

I have shown a preferred embodiment of my invention, but it is clear that numerous changes and omissions can be made without departing from its spirit.

One of the unusual characteristics of the transfer is that the marking contains only a very small percentage of fusible material having a sharp melting point, in comparison with transfer markings which have been heretofore employed. The gum dammar does not have a sharp melting point, and it becomes viscous and tacky when it is heated. This makes it possible to form the transfer marking solely by a direct printing operation. Likewise, the transfer marking does not become liquid at the transfer temperature of 190° F. or the like. The marking becomes tacky so that it can be transferred by the use of great pressure, which is very much greater than the pressure which has been heretofore employed. Heretofore transfers of the heat and pressure type have been applied with the use of an ordinary flat iron. It will be noted that the transfer marking can be made according to the design which is to be transferred, and that said transfer marking is free from water and that it is non-hygroscopic.

I do not wish to be limited to the use of a transfer temperature of 190° F. (which corresponds to about 86° C.), but in order to define the improved transfer, it can be stated that the marking composition contains sufficient suitable fusible material to make said marking composition tacky at said temperature of 190° F., and said marking composition contains insufficient fusible material to cause it to melt at said comparison temperature of 190° F. The layer of marking material can be continuous if desired, in order to print a solid layer of color upon a sheet of leather or the like.

Since the transfer marking contains a small proportion of material which becomes liquid at the temperature which is employed, it does not spread under the great pressure employed, so that a clear impression can be secured even if fine detail is desired.

I claim:

1. A method of applying a surface layer to an object, which consists in pressing against said object a base material on which said surface layer is located, so that said surface layer is forced against said object, while subjecting said surface layer to dry heat, the temperature utilized being sufficient to render said surface material tacky, said temperature being below the melting point of said surface material, allowing the base material and surface layer to cool, and then stripping the base material from the surface layer.

2. A transfer comprising a base having a surface layer, said surface layer consisting essentially of coloring matter incorporated in a vehicle which becomes tacky and without melting when said material is heated to 190° F., so that said surface layer can be caused to adhere and without melting by applying the same to the object to be marked under suitable heat and pressure, said surface layer being releasable from said base, when said base and said surface layer have been cooled subsequent to the application of said heat and pressure.

3. A transfer comprising a base having a surface layer, said surface layer consisting essentially of coloring matter incorporated in a vehicle which becomes tacky and without melting when said material is heated to 190° F., so that said surface layer can be caused to adhere and without melting by applying the same to the object to be marked under suitable heat and pressure, said surface layer being releasable from said base, when said base and said surface layer have been cooled subsequent to the application of said heat and pressure, said material being unaffected by moisture.

4. A transfer comprising a base having a surface layer, said surface layer consisting essentially of coloring matter which is uniformly dispersed in a vehicle which becomes tacky and without melting when said material is heated to 190° F., so that said surface layer can be caused to adhere and without melting by applying the same to the object to be marked under suitable heat and pressure, said surface layer being releasable from said base, when said base and said surface layer have been cooled subsequent to the application of said heat and pressure.

5. A transfer comprising a base having a surface layer, said surface layer consisting essentially of coloring matter which is uniformly dispersed in a vehicle which becomes tacky and without melting when said material is heated to 190° F., so that said surface layer can be caused to adhere and without melting by applying the same to the object to be marked under suitable heat and pressure, said surface layer being releasable from said base, when said base and said surface layer have been cooled subsequent to the application of said heat and pressure, said coloring matter including a dye.

6. A transfer comprising a base having a surface layer, said surface layer consisting essentially of coloring matter which is uniformly dispersed in a vehicle which becomes tacky and without melting when said material is heated to 190° F., so that said surface layer can be caused to adhere and without melting by applying the same to the object to be marked under suitable heat and pressure, said surface layer being releasable from said base, when said base and said surface layer have been cooled subsequent to the application of said heat and pressure, said vehicle having a major portion of a resin which can be rendered tacky without melting when the same is heated.

WINTHROP STANLEY LAWRENCE.