

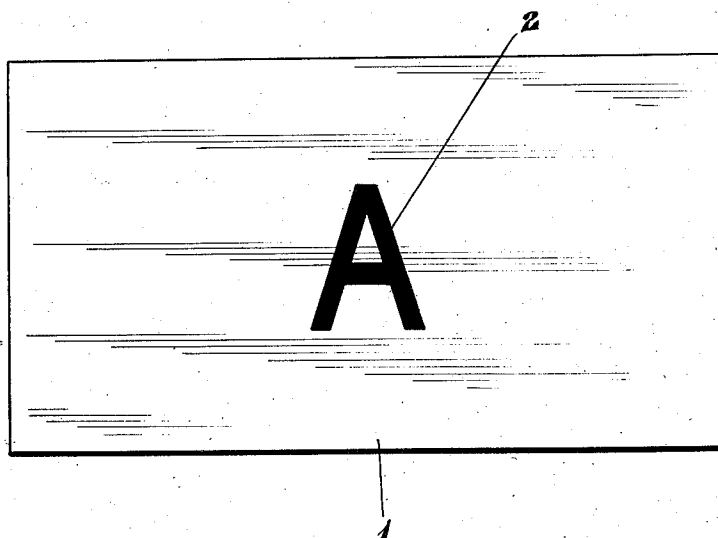
Dec. 21, 1937.

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2,103,082

TRANSFER.

Filed June 25, 1934



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UNITED STATES PATENT OFFICE

2,103,082

TRANSFER

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Application June 25, 1934, Serial No. 732,351

6 Claims. (Cl. 41—33)

My invention relates to a new and improved heat transfer.

One of the objects of my invention is to provide a transfer of this type, which will produce a marking which is indelible, not only to the action of water; and the action of the fluids which are used in laundry operations, but which will also resist a great many other solvents and chemicals.

Another object of my invention is to produce a heat transfer of this type, which can produce a marking which resists the action of substantially all known available agents, so that the marking is a true indelible marking.

Another object of this invention is to produce a heat transfer of this type, which can be applied to a stocking, and to various other articles, and to various fabrics and materials, without injuring the object to which the marking is applied.

Another object of my invention is to produce a transfer of this type, which shall utilize the class of substances which are known as the condensation resins.

Another object of my invention is to utilize that class of substances, which are set by heat and pressure, so that the properties of said substances are changed by said heat and pressure. I preferably utilize substances whose solubility is diminished by the use of said heat and pressure.

Another object of my invention is to utilize certain natural substances, which are affected by heat and pressure, so as to lower the solubility thereof in various solvents.

Other objects of my invention will be set forth in the following description and drawing, which illustrate several preferred embodiments thereof, it being understood that the above general statements of the objects of my invention is intended to generally define the same, but without limiting its scope. The drawing diagrammatically shows a transfer comprising a paper ribbon 1, having a marking 2 thereon.

Heretofore it has been known to make transfers which are indelible, in that such transfer markings cannot be dissolved in water or in the alkaline liquids which are used in laundry work. However, such transfers could be removed by utilizing various solvents, such as numerous organic solvents, which could dissolve the base of the transfer marking. This applies particularly to transfers of the heat type, in which the marking is originally imprinted upon a ribbon base made of paper or the like, and the marking is transferred from this ribbon by means of heat and pressure, while the imprinted face of the ribbon

is held in contact with the stocking or other article which is to be marked.

It is well known that certain artificial products or resins, which are generally referred to as the condensation resins, after they have been set by the use of heat and pressure, are infusible and that such products are then insoluble in all known agents, unless said agents have a powerful chemical reaction which destroys the condensation product, instead of making a true solution. For example, it is well known that certain chemicals like chromic acid, aqua regia, nitric acid, can destroy organic matter, including the condensation resins. However, if such a powerful agent were employed in order to remove a transfer marking, the stocking or other article would be seriously injured. This makes it possible to enable the detection of the removal of the improved transfer marking, since said transfer marking, as made according to this invention, cannot be removed except by the use of agents which will destroy or seriously injure the stocking or the like.

However, experience has shown that it is difficult to use these condensation resins, because they are sensitive to heat.

According to my invention, the transfer marking contains a condensation resin in the uncondensed state, and this marking should be fusible, so that it can be printed at a temperature which is sufficiently low to leave the marking on the paper ribbon unaffected by the heat. Likewise, and according to my invention, I may cause the transfer to age rapidly, so that it has a higher melting point, than when the marking is originally printed upon the paper ribbon. This higher melting point makes it necessary to transfer the marking from the paper ribbon to the stocking or the like, at a temperature at which condensation is secured.

For example, I have discovered that by using an uncondensed condensation resin of the phenol-formaldehyde type I can cause the transfer to set very rapidly. However, I have discovered that a pure resin of this type cannot be used conveniently, even if combined with an ordinary plasticizer, since this product does not remain fused so as to produce a marking composition of proper fluidity. Furthermore, when a product of this type condenses, it causes the paper ribbon to adhere very firmly to the stocking or the like. The improved transfer can be released from a stocking, after the heat and pressure have been applied, so that said release can be effected without injuring the

stocking. A transfer marking of this type may be defined as being readily releasable.

I have discovered that a very satisfactory base for a transfer composition of this type can be made with the use of lindol and shellac. The chemical name for lindol is tricresylphosphate.

This composition melts at about 75° C. A phenol formaldehyde condensation resin of the type referred to, is unaffected at this temperature. In order to properly age the composition and raise its melting point, it is preferable to replace some of the lindol by a volatile material, such as "butyl carbitol". This makes it necessary to use a transferring temperature at which condensation always results. However, it is not absolutely necessary to use the "butyl carbitol," since the marking will age on the paper and condense on the stocking or the like.

As coloring ingredients I can use suitable permanent pigments, such as cadmium selenide, carbon black, ultramarine blue, sienna, etc., although I do not wish to be limited to the use of pigments.

Careful heat control is desirable in making and printing this transfer composition on the ribbon, in order to avoid condensation before the transfer is applied to the stocking or fabric or the like.

In order to illustrate the invention, and without limiting the same to the method of manufacture or to the specific substances mentioned, or to the specific formula mentioned, the following may be stated:—

50 parts of shellac, either the orange shellac or the bleached shellac, are dissolved in 60 parts of lindol and 5 parts of "butyl carbitol" at a temperature of 110° C. Then 50 parts of cadmium selenide are incorporated into the mixture, at the previously mentioned temperature. The proportions above given are by weight.

The temperature of the mixture is now raised to 112° C. and 25 parts by weight of a suitable phenol formaldehyde condensation resin, in the uncondensed state, are now very rapidly stirred into the mixture. This uncondensed resin is in the powder form. This artificial resin is known in the trade as "Bakelite Resinoid".

This artificial resin is very fast-setting and it does not differ materially from the ordinary "Bakelite" molding powders which are used on a large scale, save that the resin is preferably free from any filler.

As soon as the mixture becomes smooth, so that it is apparent that the uncondensed resin has become thoroughly dispersed, the mixture is poured into metal pans and these pans are immediately plunged into cold water, having a temperature of about 20° C.

The time of mixing is ordinarily about 5 minutes.

The composition can now be melted, and it is ready for printing on the ribbon by means of the usual engraved rollers.

When the molten composition is used for printing, it may be maintained at a temperature of about 75° C., this being indicated by a thermometer or the like.

In printing, the operation can be started by the use of the above mentioned composition, without the use of any coloring material or condensation resin therein, in order to properly regulate the heat control.

In applying this transfer to the stocking or the like, the pressure of the iron should be about two and a half pounds per square inch of the surface of the iron. The temperature of transferring can be 250° C. The time of transferring should be at least one second.

Under these conditions a transfer made in the manner before stated sets under the action of the heat and pressure, and it cannot be removed by any known agent, save by those agents which will destroy or seriously injure the stocking or the like. Hence this type of transfer marking can be defined as one which is substantially insoluble.

The actual condensation of the resin takes place on the hosiery or other article, and the transfer marking then exists on the stocking in the condensed and infusible form.

Under prolonged heating, shellac condenses. The phenol-formaldehyde resin also condenses when it is heated, and it may contain any suitable accelerator for accelerating condensation. Hence the use of the phenol-formaldehyde resin and the accelerator, also accelerates the condensation of the natural resin so as to eliminate very lengthy heating which would be required for condensing the shellac. Ordinary shellac is soluble in alcohol. However, after the improved transfer marking has been condensed, it is not affected by alcohol, which shows that the shellac has condensed.

Markings made by means of this composition are not removed by water, by alkalies, or by ordinary organic solvents. Such markings are infusible, and they do not smear when the article is ironed or mangled. The improved composition can be used for making decorative markings, which can be washed or dry cleaned, without removing the same. The improved marking provides permanent and indelible identification.

I have discovered that the lindol seems to bleed out of the composition, and to penetrate the adjacent paper of the ribbon. This helps to increase the concentration of the condensed condensation resin in the transfer marking, and to raise its melting point, so that considerable ageing takes place upon the transfer ribbon itself, and prior to the time that the marking is transferred from the ribbon to the stocking or the like.

The improved transfer is also useful for decorating leather, by using a lower transferring temperature, such as 100° C., and using a longer time for the transfer operation. By using this relatively lower temperature, the leather is not affected, and the marking on the leather becomes very resistant against scuffing and abrasion.

Other condensation resins can be used in place of the phenol-formaldehyde condensation resin and I give the following as examples of other condensation resins in the uncondensed form and which can be condensed or polymerized by heat and pressure, for the purpose specified:—urea-formaldehyde resins, resorcinol resin, furfural resins, and in general all resins or other materials whose infusibility is increased by heat and pressure, or whose solubility is lowered by heat and pressure.

Another composition can be made by combining 100 parts by weight of paratoluenesulphonamide and 25 parts of urea formaldehyde resin, with 50 parts of coloring matter.

This invention is pioneer in utilizing a condensation product or a condensation resin for the first time, in the uncondensed state for making transfers, and subsequently condensing the material, during the application to the stocking or other object to be marked. Hence, whenever I refer specifically to an uncondensed phenol-formaldehyde condensation resin in some of the claims, I include the equivalent substances specifically mentioned herein, and other equivalent substances.

It has heretofore been proposed to use a condensed resin in marking compositions of this type, in combination with other resins or materials which acted as a vehicle for the condensed resin.

However according to this invention, I use the resin in the wholly uncondensed form, prior to the final transfer of the marking to the article to be marked.

While I have referred to the use of shellac, which can have its solubility lowered by the use of heat and pressure, and to the use of condensation resins, the invention generally covers all substances whose solubility can be lowered by the use of heat and pressure. For example, artificial resins can be formed by polymerization from unsaturated compounds, by condensation from oxygen-containing compounds, by the combined effect of condensation and polymerization, and by the action of chlorine, nitric acid and other strong reagents. Likewise, the invention is not limited to the use of resins, as other substances may exist or be discovered, which will have their solubility lowered by heat and pressure.

Whenever I refer to an uncondensed resin in the claims or in the description, it is to be understood that I wish to include a material or ingredient which becomes polymerized by the use of heat and/or pressure, so as to decrease the fusibility or the solubility of said ingredient.

Likewise, when I specify an uncondensed resin in the description or claims, it is to be understood that I include a partially condensed resin or equivalent material, since the application of further heat and pressure will additionally condense the resin or equivalent material so as to decrease fusibility and/or solubility.

Instead of using lindol, I can use any plasticizer which is compatible with shellac or other ingredient whose solubility is lowered by the application of heat.

For example, I can use diamylphthalate, dibutylphthalate, ethyl abietate.

While I do not wish to be limited to a transfer temperature of 250° C., certain of the properties of the improved transfer marking can be defined with respect to this temperature which may be used as a reference temperature for the purpose of defining the improved composition.

It will be noted that the improved marking can be fused at a temperature below 250° C. and that it remains stable at said fusion temperature which is below 250° C. That is, in order to print in a satisfactory manner with a fused printing composition for making transfers, it is necessary to maintain the printing composition in the fused condition for about half an hour. If the printing composition would condense too much during this period, it would not be stable or satisfactory for the purposes of my invention, since the resultant marking on the paper ribbon would either be wholly condensed, or condensed to such an extent as to make it unsuitable for transferring the marking to a stocking or the like.

While I have shown a preferred method of manufacture, the claims for the article of man-

ufacture are not to be limited to any specific method of manufacture.

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

I claim:

1. A heat transfer comprising a paper base having a marking, said marking being readily releasable from said base under heat and pressure and being fusible and stable at a temperature which is less than 250° C., said marking becoming substantially infusible when it is subjected to a temperature of 250° C. under pressure.

2. A heat transfer comprising a paper base having a marking imprinted thereon, said marking being readily releasable from said base under the action of heat and pressure, said marking including a phenol-formaldehyde resin which is at least partially uncondensed and which can be condensed by pressure and at a temperature of 250° C., into substantially insoluble form.

3. A heat transfer comprising a paper base having a marking thereon, said marking being readily releasable from said paper base under the action of heat and pressure, said marking including an uncondensed resin which is capable of being condensed at a temperature of 250° C.

4. A heat transfer comprising a base member having a marking imprinted thereon, said marking being releasable from said base member under the action of heat and pressure, said marking including a resin which is at least partially uncondensed and which can be condensed by pressure and at a temperature of 250° C., into substantially insoluble form.

5. A heat transfer comprising a base member having a marking imprinted thereon, said marking being releasable from said base member under the action of heat and pressure, said marking including a resin which is at least partially uncondensed and which can be condensed by pressure and at a temperature of 250° C., into substantially insoluble form, said resin being selected from a group consisting of phenol formaldehyde resins, shellac, urea-formaldehyde resins, resorcinol resins, furfural resins.

6. A heat transfer comprising a base member having a marking imprinted thereon, said marking being releasable from said base member under the action of heat and pressure, said marking including a resin which is at least partially uncondensed and which can be condensed by pressure and at a temperature of 250° C., into substantially insoluble form, said resin being selected from a group consisting of phenol formaldehyde resins, shellac, urea-formaldehyde resins, resorcinol resins, furfural resins, resins formed by polymerization from unsaturated compounds, resins formed by condensation from oxygen-containing compounds, resins formed by the combined effect of condensation and polymerization, resins formed by chlorine, resins formed by nitric acid.

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