Patented Feb. 23, 1926. 1,573,976

UNITED STATES PATENT OFFICE.

WINTHROP STANLEY LAWRENCE, OF BROOKLYN, NEW YORK, ASSIGNOR TO KAUMAGRAPH COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

TRANSFER-INK COMPOSITION.

No Drawing. Application filed September 29, 1924. Serial No. 740,520.

To all whom it may concern:

Be it known that I, WINTHROP STANLEY LAWRENCE, a citizen of the United States, residing at Brooklyn, in the county of Kings, city and State of New York, have invented certain new and useful Improvements in Transfer-Ink Compositions, of which the following is a specification.

My invention relates to new and improved transfer ink compositions.

One of the objects of my invention is to provide a transfer ink composition whereby the ink will be more readily absorbed by the fabric to which the transfer is applied, upon the washing of the fabric.

Another object of my invention is to provide a transfer ink composition which will include ingredients that can be developed upon the fibre of the fabric to which the transfer is applied, by means of the alkaline washing fluids ordinarily used for washing fabrics.

Another object of my invention is to provide a new and improved transfer ink composition of great durability and resistance so that the markings formed by said transfer ink on fabrics shall remain indelible and permanent.

Other objects of my invention will be set forth in the following description and the examples given therein, it being understood that the general statement of the objects of my invention before mentioned is merely by way of general explanation, and not by way of limitation.

It has been known for many years to make fusible transfer inks, the desired impression or marking being made upon a paper sheet or backing while the said ink was in a molten condition, so as to form the transfer. The transfer was then placed upon the fabric or article to be marked, with the ink in contact with said fabric or article, and heat and pressure were then applied to the transfer so as to cause the fusible ink to melt and penetrate the fabric or article, thus producing the desired impression or marking.

A transfer of this type may be termed a "heat" transfer.

I have found that by incorporating an emulsifying agent into the ink that a greater penetration of the dye or pigment is secured in the article which has been marked, when the said article is subjected to the ordinary washing operation with alkaline fluids. If proper emulsifying agents are chosen such as those later mentioned herein, I believe that when the article is subjected to the action of the alkaline washing fluid, that an emulsion of the dye or pigment is formed by the action of the washing fluid which penetrates the fabric, and that when the dye stuff, etc., is in the form of an emulsion, that it possesses additional penetrative qualities. In addition, it must be noted that the ordinary alkaline washing fluid is hot so that the action of the washing fluid and the emulsifying agent forms a hot emulsion of the dye stuff, etc., which to a certain extent is already in contact with the fibres of the article upon which the impression has been formed so that the said dye stuff penetrates further into the fabric.

For example, I have found that when Turkey red oil is used as the emulsifying agent and the indulines and nigrosines and the like are used as the dyes, and the impression is formed on a linen or cotton article, that the transfer impression which was originally on only one side of the fabric penetrated completely through the fabric until it was visible on both sides thereof.

Among the emulsifying agents which I prefer to incorporate are various sulphonated oils such as Turkey red oil, lanolin, sulphonic acid such as Twichell's reagent. The compositions containing these emulsifying agents are preferably free from water.

As an example of such an ink, the following may be given:—5 grams of lanolin, 10 grams of Turkey red oil, 5 grams of No. 4 lithographic varnish.

These above mentioned three ingredients are intimately mixed and then stirred into 50 grams of melted coumarone resin, such as "cumar," for example. The dye stuff may consist of 10 grams of induline base which may be added at any time to the other substances before mentioned.

In a composition such as before mentioned, it is impossible or very difficult to use many direct dye stuffs such as direct red, that is, dye stuffs which do not require the use of a mordant for forming a marking on cotton.

These direct dye stuffs are usually soluble

in water and many of them are soluble in glycerine.

I therefore prefer to add glycerine to my composition and to have the said glycerine contain a dissolved direct dye stuff. The purpose of the composition containing the glycerine is not necessarily to secure greater penetrative effect, but to permit the use of many dye stuffs which otherwise could not be employed in a transfer ink.

The composition containing a direct dye stuff may be made as follows:—30 grams of glycerine, 5 grams of lanolin, 10 grams of Turkey red oil, and 5 grams of No. 4 lithographic varnish are intimately mixed and stirred into 50 grams of melted coumarone resin, such as the "cumar" before mentioned. The dye stuff may be about 5 grams of direct red which is dissolved in the glycerine before the mixture before mentioned is made, so that the completed composition is an emulsion containing a glycerine solution of direct red.

When a linen or cotton article upon which an impression has been made with the use of the last mentioned composition is acted upon by the hot alkaline washing fluid the ink decomposes or disintegrates much more than a composition free from water soluble substances and this enables the direct dye to affix itself much more readily upon the fibre of the article.

This emulsified transfer ink containing glycerine is a soft flexible, non-sticky and fusible composition and it can be handled like the ordinary fusible transfer ink heretofore known.

In addition to the direct red before mentioned, aniline black in the "leuco" or reduced form could be added as this oxidizes upon contact with the air so as to form a black marking.

The aniline black in the form last mentioned is stable in an acid solution but is rapidly developed in an alkaline solution, that is, it is rapidly oxidized in an alkaline solution to form the black color.

Another substance which could be used for developing the aniline black on the fibre of the article is para-phenylene diamine hydrochloride.

I have also found that various nitro bodies such as the nitro benzols, the nitro naphthalenes such as alpha nitro-naphthalene, as well as other nitro derivatives of organic compounds can be used to increase the permanence and resistance of indelible transfer inks where induline is used as the coloring matter. These nitro substances are used to dissolve a part or all of the induline or other coloring matter and the dissolved coloring matter is then added to the rest of the composition. Similar results are secured by many amino compounds as well as by the use of phenolic derivatives but the nitro bodies give superior results for this purpose. Inks containing such substances need not be emulsions as they combine with resins such as "cumar" for example.

I have found that dye stuffs which are soluble in various oils such as the indulines, including the nigrosines, Victoria blue B base, oil reds, etc., can be incorporated in such compositions containing the coumarone resins together with dyes which are resistant to washing fluids so as to provide indelible transfer inks. Superior results are secured by adding certain bodies such as alpha nitro-naphthalene, to give increased permanence and resistance. The vehicle may slowly decompose on the fibre. The washing caues the dye stuff to become fixed in the fibre producing a very permanent mark.

As an example of such a composition, the following may be given, the proportions being by weight:—50 pts. cumar, 20 pts. of a fast red litho ink, 5 pts. oil red, 5 pts. alpha nitro-naphthalene. Other pigments and dyestuffs can be used to give other colored transfer compositions. I believe that the alpha nitro-naphthalene either acts as an oxidizing agent, or as a catalyst to accelerate oxidation. The last mentioned composition yields a superior indelible black marking if ten parts of induline are used instead of the oil red and a fast black litho ink is substituted for the red ink mentioned.

Certain dye stuffs can be used with fusible acids which are removed by the alkaline washing fluids such as stearic and palmitic acids in order to give transfer inks which will produce indelible markings on linen goods in various colors. For example, the following might be used:—50 pts. stearic acid, 10 pts. Victoria blue B base, 50 pts. cumar.

Where a coumarone resin is specified, I prefer to use the artificial and neutral resin such as "cumar" so that the neutral resin will not be affected by the washing fluids.

I claim:—

1. A fusible transfer ink releasable from a paper transfer base under the action of heat, said ink embodying a fusible base, a coloring agent, and an emulsifying agent, said emulsifying agent being adapted to cause the emulsification of said coloring agent when said ink is acted upon by an alkaline washing fluid.

2. A fusible transfer ink releasable from a paper transfer base under the action of heat, said ink embodying a fusible base, a coloring agent, and Turkey red oil.

3. A fusible transfer ink releasable from a paper transfer base under the action of heat, said ink embodying a fusible base, an induline, and Turkey red oil.

4. An emulsified transfer ink releasable from a paper transfer base under the action

of heat, said ink embodying a fusible base.

5. An emulsified transfer ink releasable from a paper transfer base under the action of heat, said ink embodying a fusible base and a dyestuff solution.

6. An emulsified transfer ink releasable from a paper transfer base under the action of heat, said ink embodying a fusible base and a solution of a dyestuff in a nitro-organic compound.

In testimony whereof I hereunto affix my signature.

WINTHROP STANLEY LAWRENCE.