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BLACK PRINT ON TRACING CLOTH AND METHOD OF MAKING SAME

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This invention is concerned with the reproduction of illustrations, drawings and tracings on ordinary commercial tracing cloth.

Such reproductions on tracing cloth from tracings are made by first preparing the tracing cloth, then making a negative from the illustration to be reproduced and thereafter making a print from the negative on the prepared tracing cloth and then developing the latter.

As a result of this process there is obtained a print on tracing cloth of black lines on a very light background, and it may be called a tracing cloth positive.

In carrying out this known process, the tracing cloth is necessarily waterproofed and the print is made on top of the waterproofing and heretofore there has been no known means, so far as I know, for removing the waterproofing from the tracing cloth. The resulting tracing cloth positive print has therefore not been altogether satisfactory.

The fact that the waterproofing remains on the finished print is a serious objection and obstacle to the commercial utilization of this method on a large scale, because the waterproofing makes the print more opaque than ordinary tracing cloth and quite brittle. The black lines are easily washed off or peel or run when water happens to be spilled on the print. The latter also turns yellow after a comparatively short time and the appearance of the print is not good.

I have discovered a means for removing the waterproofing from a tracing cloth positive print, so that I am able to make and finish such a print in a manner that it looks exactly like an original tracing, has the same characteristics and in which the tracing cloth permits of the same treatment by a draftsman as may be made on or with an original tracing such as erasures, the use of drawing ink for making corrections, the applications of color, superior transparency for blue printing purposes and the like. In order to accomplish this result, the tracing cloth is brought back to its original condition, and this has not heretofore been possible so far as I know. In fact, a tracing cloth positive print made according to the herein described method is almost superior in appearance to that of the original tracing. The two can hardly be told apart.

For the purposes of explaining this invention, use is made of the words tracing, tracing cloth and other well known names of materials. However, these and other terms, words and names are used in a purely illustrative sense only and not as limiting the invention. The process comprises the following steps.

First:—The tracing cloth is waterproofed by coating it with a suitable water proofing solution and thereafter it is dried. An eighty gallon water proofing solution may be made by mixing the following ingredients.

Dibutyl phthallate	17 lbs.
Butyl propionate	14 lbs.
Lacquer	50 gallons
Acetone	59 gallons

Dibutyl phthallate may be replaced wholly or in part by suitable quantities of diamyl or diethyl phthallates, tricresyl or triphenyl phosphates, dibutyl or diethyl tartrates, triacetin or other plasticizers or mixtures thereof.

Butyl propionate may be replaced wholly or in part by suitable quantities of ethyl lactate, diacetone alcohol, tetrachlorethane, furfural or other high boiling solvents or mixtures thereof.

Lacquer in the above formula is an acetone solution of a low-viscosity nitrocotton, the viscosity of the solution being 117–125 by the MacMichael viscosimeter. It may be replaced by cellulose acetate.

Acetone may be replaced wholly or in part by suitable quantities of ethyl, methyl, amyl or butyl acetates, amyl, butyl or isoprophyl

alcohols, ethyl propionate or other low boiling solvents or mixtures thereof.

Second:—The water proofed tracing cloth is coated in any suitable manner with a light sensitive coating or emulsion, and is again dried and then ready for use. A suitable emulsion may be made by mixing a small quantity of ammonia and sufficient water for one liter with

Le Page's glue	110 grams
Potassium bichromate	12 grams
Silver nitrate	90 grams
Potassium chloride	40 grams
Alcohol, formula 30	360 c. c.
Concentrated ammonia	Variable small quantity
Water to make	1 liter

Alcohol, formula 30, is a specially denatured alcohol made by adding 10 volumes of pure methyl alcohol to 100 volumes of ethyl alcohol.

Third:—In making a print on the waterproofed and coated tracing cloth it is necessary to have a negative of an original which is made photographically or by any other means on suitable negative material such as cloth, paper, glass, film or the like. Such a negative has of course white lines on an opaque background. The negative is placed against the coated side of the tracing cloth, exposed to light and a print made in the usual manner of making prints from a negative.

Fourth:—The printed cloth is then washed with water to remove the emulsion from the unexposed portions thereof. That is to say, the emulsion which was under the opaque portions of the negative is removed with water.

Fifth:—Thereafter the print is developed by being placed in a developing bath which may consist of

Sodium carbonate (soda ash)	4 oz.
Sodium sulphite	4 oz.
Hydroquinone	¾ oz.
Monomethylparaminophenolsulphate	¼ oz.

The latter chemical is sold under a variety of trade names such as metol, pictol, rhodol, etol and others.

In the developing bath the exposed portions or lines on the print turn black, while the background is practically white or very light in color.

Sixth:—After having been developed, the print is again given a water bath or washed to remove all surplus developer and then dried.

Seventh:—The last step in the process consists in dipping the finished print into a solution adapted to remove the waterproofing from the tracing cloth without removing the printed lines. One gallon solution for waterproof removing may be made according to the following formula:

Methanol	1 volume
Ethyl lactate	1½ volumes
Alcohol, formula 30	10 volumes

or

Butyl propionate	7 fluid oz.
Acetone	9 fluid oz.
Alcohol, formula 30	14 fluid oz.
Butyl alcohol	35 fluid oz.
Carbon tetrachloride	63 fluid oz.

I prefer, however, to use the first of these waterproofing removing formulæ.

The print is left in the last named solution for a certain time determined by experimenting. Care must be taken not to leave the print in the solution too long, because the printed lines are on top of the waterproofing so to speak and if the print is left in the solution too long, the printed lines will also be removed.

Eighth:—Thereafter the print is dried by placing it face downward on a sheet of blotting paper and dried by applying a rubber squeegee. This removes the waterproof solution from the print, the face of which is dried being next to the blotting paper. It also appears, that the printed lines on the tracing are practically squeezed into the cloth mechanically.

The finished print is not waterproof any longer and the tracing cloth regains its natural appearance and characteristics. It is a black line positive print on tracing cloth having a superior appearance and all the characteristics of an ordinary tracing on tracing cloth.

I claim:—

1. The method of producing prints on tracing cloth which consists in waterproofing the cloth, coating it with a light sensitive coating, exposing the tracing cloth with a negative to produce a print, developing the printed tracing cloth and thereafter removing the waterproofing.

2. The method of reproducing an original tracing on tracing cloth which consists in waterproofing the cloth; coating it with a light sensitive coating capable of being removed by washing, after exposure, from the unexposed portions thereof; exposing said cloth with a negative of the original to produce a developable print; washing the print to remove surplus coating; developing the print and washing the print to remove the waterproofing from the non-exposed portions thereof.

Signed at New York city, in the county of New York and State of New York, this 7th day of May, A. D. 1930.

KNUD MURCK.