Aug. 26, 1941. W. M. HINMAN ET AL 2,253,562

PHOTOSENSITIVE TRANSPARENCY

Filed July 8, 1939

Fig. 1

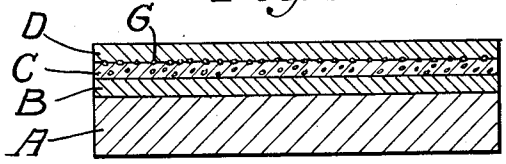


Fig. 2

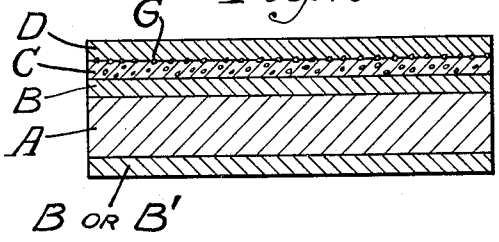


Fig. 3

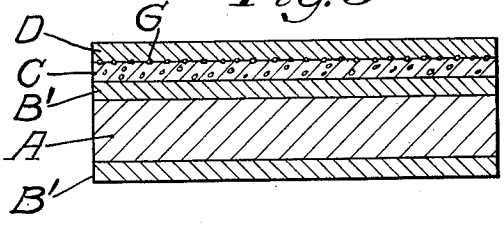
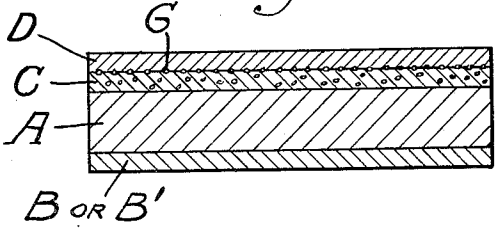


Fig. 4



A = TRANSPARENTIZED BASE SHEET AS OF PAPER OR CLOTH CONTAINING TRANSPARENTIZING AGENT SUCH AS OIL, FAT OR WAX, FOR EXAMPLE, THE BASE SHEET BEING COMMERCIAL TRACING CLOTH.

B = WATER-PROOF COAT FROM COATING COMPOSITION CONTAINING COATING BASE AND TRANSPARENTIZING AGENT NON-SOLVENT OF SAID BASE.

B' = WATER-PROOF COAT.

C = WATER-PROOF GRIT-CONTAINING COAT DEPOSITED FROM COATING SOLUTION WHICH IS NON-SOLVENT TO COAT B AND WHICH CONTAINS A COATING BASE AND GRIT.

D = LIGHT-SENSITIVE COAT OF THE CHROMATE-GLUE TYPE.

G = GRIT FOR DRAWING "TOOTH".

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PHOTOSENSITIVE TRANSPARENCY

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Application July 8, 1939, Serial No. 283,377

16 Claims. (Cl. 95—8)

The present invention relates to draftman's transparencies which are light-sensitive, and to photographic prints made therefrom. Commonly, these materials are termed "photo-tracing" sheets because they serve as "tracings" for making reproductions. They are also termed "reproduction cloths," because they are commonly on a cloth base. These sheets are termed "tracings" in spite of the fact that they may not be used actually for tracing. Fundamentally, the article of the present invention is a light-transmitting (so-called "transparent") sheet, upon which is located a sensitized coating capable of treatment by light-printing and subsequent development to form an image. The developed image is commonly the lines of a drawing, that is, the image is a positive one with considerable background which is free from image.

Such an article is very useful in the drafting field. Where transparencies, such as tracings, become worn, a new one or multiple ones, may be reproduced. It is useful for grouping several drawings or designs from separate sheets onto one sheet. The positive reproduction is made by first producing one or more brown prints, or photographic negatives (which permit changes in size). Brown prints may be assembled with or without blocking out parts thereof, into an arrangement in contact with the "photo-tracing" for light-printing through the brown print. Thus, the desired positive is obtained on development.

The term "transparent" or "transparency" is used in a popular or trade sense, rather than in its technical sense. The sheets are light-transmitting and light-diffusing, and are technically translucent. When in contact with an object they appear "transparent" to varying degrees, since the image seen through the sheet is sharp without such diffusion as destroys the outline.

It is an object of the present invention to produce a photo-tracing sheet which is waterproofed to withstand the application of an aqueous sensitizing composition and to withstand a subsequent development involving water.

It is another object of the invention to apply water-proofing coatings which do not lessen transparency of a transparentized base sheet, and which may effect an increase in transparency thereof, or effect transparency in an untransparentized base sheet.

It is still another object of the invention to present a surface on the sheet after development, such that ink may be used thereon and retained, and such that hard pencil may be used thereon to produce non-smudging lines of sufficient density to serve as images which are comparable, in making blueprint or other copies, to ink or to the light-formed image.

In carrying out the invention any suitable base material may be used such as paper, films, cloth and the like. Preferably tracing cloth is used as the base material. It is a transparentized filled woven sheet. Transparentized paper may also be used, but it lacks the strength and durability of cloth. Considering first one side of the base, it is waterproofed by a coating composition of such character that any original transparency is not lost, or is improved. Taking this once-coated sheet, the coat may be sensitized by a suitable composition, or the uncoated side may be waterproofed, and then either waterproofed side may be sensitized. However, where a pencil-drawing-surface is desired on either the photo-side or the other side, a coat is formed which is waterproof, and which also contains a grit to give a surface which is suitable for ink, and which has a suitable tooth for pencil. In spite of thus adding a considerable quantity of grit to the sheet, transparency may be added to the sheet by properly coating. The light sensitive composition is applied, preferably over the grit-coated face where that is present. Care is taken in compounding these coating compositions, that the application of one composition onto the coat of another composition, does not disturb or dissolve the said coat. Where the back of the sheet is coated to produce a waterproof coat, it provides protection to the base against damage from wetting of it in process of manufacture, or in use. This back-coat may be a transparentizing one, if desired. The two faces may be waterproofed simultaneously or separately.

Where a transparentized base such as paper or cloth is used, the transparentizing agents commonly found are oils, fats or waxes. Tracing cloth, for example, is a woven fabric of combed lawn, filled with starch, gelatin or like hydrophilic substance containing emulsified fats, waxes or oils, or other transparentizing agents, particularly vegetable oils. We have found that application of simple coating compositions containing volatile organic solvents which are also solvents for such transparentizing agents, causes extraction of such agents and a decrease in transparency. Our coating compositions are formulated to lessen or avoid such detransparentizing action. We do this by incorporating transparentizing material in our coating composition, and preferably to such extent that we effect an increase in transparency. The details and process are more particularly set forth in our so-filed application Serial No. 283,376, filed July 8, 1939.

In experimenting with various coating compositions on common tracing cloth, we have discovered that applied solutions of coating material are capable of extracting transparentizing material from the body of the cloth into the resulting coat. We have found that the solvent in the coating composition does this, and further, that after the solvent has been evaporated, the

migration of transparentizing agent from the cloth to the coat continues. The transparency of the body of the transparentized cloth is actually lowered even though the coat itself be perfectly transparent. However, where the coat has of necessity been slightly translucent by reason of some inclusion therein, the transparency obtained has been reduced by two factors, namely, the extraction of transparentizing material from the cloth, and the super-imposition of a light-obstructing coat. By means of the present invention, we may add a light-obstructing coat with less or no loss of, or even with improvement in, the transparency of the cloth body itself. We have been able to produce on a tracing cloth a light-obstructive coat, and to produce a coated cloth more transparent than the uncoated cloth.

We accomplish our purpose in one way by using a coating solution which has its solvent power for the transparentizing agents of the cloth partially or wholly satisfied. We may produce transparency by using a coating solution which on drying yields a transparentizing agent to the cloth. The mechanism may be more mixed than above indicated. For example, the coating solution or resulting film may extract some of the transparentizing agent from the cloth, and at the same time yield to the cloth the same or a different transparentizing material present in the coating composition. Whether the final coated cloth, compared to the uncoated cloth, has more, or less, or the same transparency, depends entirely upon the manner in which the present invention is carried out. We prefer, obviously, to carry out the invention to secure a coated cloth which is more transparent after coating than before, and hence illustrate our invention by a preferred procedure which accomplishes such purpose.

However, it is to be understood that our invention is not limited to the coating of prepared tracing cloths found on the market, which already contain a transparentizing agent. Our preferred procedure of using a coating composition which readily yields a transparentizing agent, may be used to coat a paper or cloth, or other such sheet capable of being transparentized, to yield said agent to the sheet coated, thus to transparentize it as well as to coat it.

Thus, in either case, we obtain a tracing sheet which has a transparentized body and a transparent coat, each containing a transparentizing agent for the body, whereby there is a balance of forces, one tending to cause migration of the agent from the body into the coat, and the other tending to cause migration of said agent from the coat into the body, or providing a partial or complete saturation of the film so as to prevent some migration from the body to the coat.

In the trade the tracing sheets provided (commonly of cloth) are primarily intended to receive ink, but in those special cases where they have been specially treated to serve also in some acceptable degree for pencil, they are termed "cloths for pencil."

Heretofore, cloths for pencil have been of such grade as to limit their use to pencils of hardness H or 2H, in order to secure a satisfactory density to the line drawn. In the practice of our invention, the inclusion of grit for "tooth" need not be limited by requirements for transparency. According to our invention, we may produce a coated cloth for pencil which is more transparent than the uncoated cloth, and which permits of sufficient grit so that it will take a pencil of 4H to 6H. Draftsmen prefer such harder pencils, because they make finer lines, but heretofore they have not been able to use them because the line was not sufficiently dense. Consequently, they have been compelled to use softer lead which has more greasiness, to get lines sufficiently dense. Such lines are more likely to smear or smudge. By our invention we may produce a cloth for pencil which readily takes a hard pencil and produces a non-smearing line of density effectively equivalent to ink lines for the purpose of reproducing copies from the tracing. Such a drawing medium is a great contribution to the drafting art, because it eliminates the prior necessity (for good reproductions) of penciling a tracing and then inking over, or first penciling onto drawing paper, and then inking onto a tracing cloth placed over the penciled paper. The photo-tracing of the present invention may have all the useful characteristics of such tracing cloths after the image is developed thereon. It provides a photographic image on tracing cloth, which cloth permits supplementing the image with ink or pencil, and using the supplemented image for reproductions. Other advantages are obvious, for example, the ability to change the "tracing" by erasure of the pencil portions.

The trade prefers a tracing cloth rather than a tracing paper, because the woven base gives strength and assurance against damage or tearing. Inked or photo tracings are used to reproduce copies by a light-printing process, and they are therefore subjected to considerable handling. Furthermore, they are preserved for long periods of time for such use, and as permanent records. Therefore, the preferred embodiment of the present invention involves a tracing cloth. Because of roughness from the weave, the cloth is filled and transparentized to give a smooth drawing surface. Such filling and transparentizing is a complex process and is carried on by but a few manufacturing sources. The resulting cloth has heretofore been employed for the receipt of a coating composition containing grit, to improve its surface, as described in British Patent No. 483,011 to Paul Koenig. In carrying out our invention we may begin with any original commercial "tracing cloths." We may also use our invention on any suitable filled cloth, even though it has no transparentizing agent in the filling. In such case, our process provides the transparentizing agent. For example we may use our invention on the following commercial tracing cloths which are already transparentized but not lacquered or otherwise coated over the filling material.

"Imperial," Winterbottom Book Cloth Co., Ltd., Manchester, England.

"Excelsior," Winterbottom Book Cloth Co., Ltd., Manchester, England.

"Arkwright," Arkwright Finishing Co., Providence, Rhode Island.

"Prudence," Arkwright Finishing Co., Providence, Rhode Island.

"Kosmo Spezial," Richard Schwikert, Freiburg, Breisgan, Germany.

(No mark), J. Landauer, Braunschweig, Germany.

We may also use the process on paper, a desired requirement of which is that it is not sized or filled with mineral filler which will add to opacity. Such paper may be absorptive of the coating

composition or non-absorptive of it, so long as there is good adherence of the resulting film. Our preferred coat or coating composition readily exudes the transparentizing agent into the paper, and apparently with considerable force where there is a good interface by good anchorage.

In carrying out our invention in its preferred manner, we do not need to know the identity of the transparentizing agents in a transparentized filled tracing cloth. In the trade, the basic item is not the woven fabric, but rather it is the filled transparentized woven cloth, manufactured as a basic commodity, and distributed widely for sale or to manufacturers who process it further.

These manufacturers further process the basic commodity without regard to the constituents thereof. Therein has been the underlying cause of the defects in coated commercial cloths. In practicing our invention we likewise do not consider the constituents of the cloth, but having the knowledge that a transparentizing agent is extracted by a coating solution, we use a coating solution which has a transparentizing property for the filled cloth, in order to compensate for any detransparentizing effect, which the same composition might have. The latter effect may readily be determined by omitting the transparentizing agent which we add to our composition. We prefer to make the transparentizing effect greater than the detransparentizing effect, but this is not always necessary. Where we use but one coat, it may, in some instances, be necessary to consider the effect of the coating composition as to the kind of surface presented by the resulting coat. For example, if the coat is to be coated directly with a sensitizing emulsion, it must not be so water-repellent that the emulsion will not spread.

We have found that by using a coating solution containing a transparentizing agent, the coating as applied, or as it dries, can share such agent with the cloth. The cloth also may share its transparentizing agent with the coating. Therefore, we prefer to use enough agent to get a net improvement in transparency. However, we may use less than this amount and secure no change, or some loss in transparency, yet an improvement over use of a coating without a transparentizing agent to be shared by the cloth.

The character of the coating solution may vary widely, and commonly it embodies a solid base such as a cellulose derivative, or a mixture of bases, in a volatile solvent with plasticizer for giving flexibility. For example, a nitrocellulose base requires a plasticizer therefor. We find that those plasticizers which are oily or liquid are also transparentizing agents. These may be synthetic, such as dibutylphthalate, or natural, such as castor oil, or other vegetable oils, and mineral oil. We may use a non-transparentizing agent as plasticizer, such as some of the alkyl sulfonamides, and use a transparentizing oil in addition, which oil may have some additional plasticizing property. A plasticizer may be solvent plasticizer or non-solvent plasticizer. The former has a solvent power for the base plasticized, while the latter does not and is mechanically held or dissolved in the base plasticized. Castor oil and mineral oil are non-solvent plasticizers for nitrocellulose, and if an excessive quantity is used as a plasticizer, the excess is rejected by exudation. It is this effect which is desired in this invention. Hence we use a transparentizing agent which is rejected, and its function as a plasticizer is only incidental. If the amount retained is not sufficiently plasticizing we may add other plasticizer. This may or may not add to the transparentizing action. Where it is a solvent plasticizer it is less likely to exert a transparentizing action because the affinity for the base to hold it is greater than the tendency to reject it and the tendency of the sheet to absorb it. Too much solvent plasticizer makes the coating more thermoplastic, and subject to sticking to another surface, especially a like surface.

Where the transparentizing plasticizer is highly compatible with the base of the lacquer it is retained by the liquid lacquer and by the film deposited from the lacquer, and it is not readily shared with the cloth, if at all, for the purpose of transparentizing it. For example, castor oil which is a non-solvent plasticizer for nitrocellulose, is normally a good transparentizing agent for the cloth, but it is too highly retained by the lacquer to be given up to the cloth. This is true of dibutyl phthalate and other solvent plasticizers. Hence, where we want the agent to be yielded to the cloth it must be one which in the quantity present, is not readily held by the film on drying or when dried. We therefore use a transparentizing agent which the film tends to reject, thus increasing the relative claim for it by the cloth. Because we use such a rejectable agent for transparentizing, some of it may be left in the resulting coating as a plasticizer. This permits having solvent plasticizer, where it may be desired. However, by depending upon the retained agent as plasticizer and by not using solvent plasticizer, we produce a "stick-proof" cloth, if our first applied coat is exposed at the surface. We prefer to use mineral oil as our transparentizing agent for a nitrocellulose base lacquer, because it has a limited solubility in a dried nitrocellulose coating, and because it is liquid and readily exuded under normal conditions. There is a tendency for mineral oil dissolved in common with nitrocellulose in a solution to exude as the solvent dries away. This tendency to exude is augmented by contact with the tracing cloth to absorb it, thus transparentizing the cloth. The use of too much oil may of course cause some exudation at the surface of the coating, which should not be unduly oily. The effect of this tendency will be discussed later.

For the drawing surface for pencil, there must be a "tooth." This is accomplished mechanically by including a "grit" or like substance. This may be an additional inclusion in a lacquer coat which renders the said coat less transparent than without it. It is an "opaquing" agent, the effect of which reduces the benefits of including a transparentizing coating to benefit the body of the cloth or paper. However, the invention may be used to secure greater transparency in the coated body sheet than in the uncoated sheet, in spite of the opaquing effect of the presence of "grit."

The "grit" may be any solid substance, preferably a transparent mineral powder, and it may be chosen to have an index of refraction near that of its vehicular coating to render it less "opaquing." Because of the great benefits towards transparency produced by using mineral oil in a nitrocellulose solution, we do not need to select the grit on the basis of its index of refraction, and may select it for other properties. We prefer a transparent type of grit, such as an abrasive silica, like ground quartz, which is readily available, clean and not subject to discoloration. Transparent grit to opaque grit may be

used, and the selection of material may depend upon various factors. We have used ground glass, tricalcium phosphate, calcium carbonate, barytes and others. One reason for preferring silica is that it is highly transmissive of ultra violet light, which is a highly actinic component of the light rays used in reproducing copies such as blue prints and diazotypes.

We are not limited to coating but one face and may coat both faces. However, where we make such a change and use the same or similar solution on both sides, we may reduce the amount of transparentizing agent in the composition by nearly one-half, because it enters the cloth from both sides. This reduces the amount present to be exuded at the surface, to such an extent that there is no troublesome oiliness on the surface. It seems that the preference in direction of exudation is toward the body anchored to the coat, the absorbency of which seems to be like a suction action to remove the oil. For tracing cloth, the preference in the trade is for an uncoated and glossy back, because it picks up less dirt. For photo tracing the same reasons apply, but since it is exposed to danger of wetting, the back is made glossy with a waterproof coat. This may or may not be compounded to transparentize.

We may use a coat according to this invention, but lacking grit, which will dry to a quite oily surface. Upon this we may apply another coat without any transparentizing agent, but carrying grit, to provide a non-oily drawing surface.

The use of a large amount of abrasive gives excellence as a cloth for pencil. This makes it unnecessary to press down on the cloth to effect a heavy line. Heretofore such pressing was necessary, and the physical depression made in the cloth showed up badly on erasing, and did not permit complete erasing. Heretofore, it has been practically impossible to use enough grit to give this property, because the quantity necessary would have detracted too much from transparency. Because we are able to improve transparency, we may go further in the direction or using more grit than the prior art has permitted. The tracing cloth of this invention permits erasing with soft erasers such as art gum, and thus there is little if any removal of the coating substance below or laterally of the lines erased.

In compounding the coating compositions, the components may be varied in well known ways for the proper qualities. One composition must exhibit good adherence to the cloth or paper. The grit-coat must be tough enough to retain the grit well against erasures and drawing forces.

The preferred form will now be considered. The first coating composition may include the grit, but since an oiliness will be inherent in the exposed surface, it does not so readily lend itself to application of a hydrophilic substance such as will be later described with reference to the sensitizing composition. Therefore, we prefer to apply first a non-detransparentizing waterproofing solution without the grit, and on it apply a coating containing the grit, which will present a surface practically free from oil. The second composition must not disturb the coat of the first composition. Over the grit-coat we apply any well known light-sensitive composition, such as a bichromate salt and glue or gelatin, which is rendered insoluble by action of light. In this we include a substance such as silver chloride, capable of retention in the insoluble protein for development to form a pigment. Silver chloride may be "developed" to silver by known photographic reducing agents. The unchanged sensitive composition is readily washed away with its silver chloride content to expose the "grit" of the drawing substance. It is needless to remark that the coatings must protect the base from considerable abuse, such as short or prolonged exposure to water, with or without rubbing and handling, followed by drying.

Many combinations of coatings are possible, and it is not deemed necessary to do more than illustrate those used in combination, to mention their properties and functions, and to state the relation of one to another. Those skilled in the art will readily perceive how substitute compositions may be applied to produce the same and other combinations with the same ultimate results. The following examples give specific compositions, which will later be discussed.

EXAMPLE 1.—*Waterproofing on drawing side*

	Parts by weight
Butyl acetate	183
Anhydrous ethyl alcohol	157
Naphtha	151
Duraplex N. D. 75 [1]	43
Paraplex R. G. 2 [1]	43
Cotton solution [2]	354
Dibutyl phthalate	31
Ethyl alcohol (anhydrous) containing dissolved dye (⅛ oz. Pontacyl Fast Blue R per gallon)	28
"White Rose" neutral mineral oil [3]	10
	1000

[1] Both are resinous plasticizers sold by Resinous Products & Chemical Co., Philadelphia, Pennsylvania.
[2] A 25% solution of ½-second ester-soluble cotton in ethyl acetate.
[3] Liquid paraffin oil from Standard Oil Company of Indiana, Whiting, Indiana.

In the foregoing the mineral oil is the transparentizing agent, and the "Duraplex" and the "Paraplex" are plasticizers of the type which are used to modify the properties of the coat rather than of the base which is coated.

EXAMPLE 2.—*Grit-coat*

	Parts by weight
Aqueous ethyl alcohol (95% alcohol, 5% water by volume)	82
Silica	8
Color (1 ounce Pontacyl Fast Blue R in 8 gallons anhydrous ethyl alcohol)	4
5 to 6-second nitrocellulose (alcohol soluble cotton)	2
Shellac (dewaxed)	4
	100

The silica (about 300 mesh) is ground for 8 hours more or less in a ball mill with half of the 95% alcohol to reduce its fineness and to wet it thoroughly with alcohol. Then the remaining ingredients are added, and the mixture agitated until all the soluble materials are in solution.

EXAMPLE 3.—*Backing solution*

	Parts by weight
Anhydrous ethyl alcohol	92
5 to 6-second alcohol-soluble cotton	2.7
Shellac (dewaxed)	5.3
	100

EXAMPLE 4.—*Sensitizing emulsion*

	Liquid ounces
Water	77
Glue (LePage Photo-Engraving)	5
Potassium chloride solution (consisting of water and 1.43 ounces by weight of dry C. P. salt)	9
Silver nitrate solution (consisting of water and 3.07 ounces by weight of dry salt)	9
	100

The glue is completely dissolved in water. The other two solutions are simultaneously run into the glue solution, keeping the potassium chloride slightly in excess in the glue vehicle. This forms silver chloride suspended in glue and water, which is stable for long periods. To this is added 9 fluid ounces of ammonium dichromate solution (11 grams of said salt).

The invention is illustrated diagrammatically in the drawing in which:

Fig. 1 represents on an enlarged scale with exaggerated proportions the relative positions of the base sheet and the added layers, with a treatment on only one side of the base.

Fig. 2 represents the structure of Fig. 1 with a waterproof coat on the second face.

Figs. 3 and 4 represent modifications described in detail hereinafter.

PROCEDURE

In carrying out the invention, when the base A (Figs. 1 and 2) is filled transparentized cloth, one or both sides is first waterproofed with the transparentizing solution of Example 1, to provide coat B, then the sheet with coat B is coated on one side with the grit composition of Example 2 to provide a coat C with grit G. If the compositions of Examples 1 and 2 are applied only to one side, then for protection the other side may be coated with the composition of Example 3 to provide coat B' as in Fig. 2. The cloth is now waterproof on both sides, and it is transparentized by composition of Example 1. Onto the grit-coat the sensitizing material of Example 4 is coated and dried in a dark room or one not having actinic light to provide coat D.

USE OF THE PRODUCT

The sensitized cloth is printed by action of actinic light through a negative of the desired pattern. The light renders the glue-base coat insoluble. The dark areas of the negative protect the ultimate free areas of the design positive, leaving the glue-base soluble in said protected areas. These areas are freed from silver chloride, by washing away the soluble glue-base and rubbing and flushing away the silver chloride. After this washing the silver-chloride carried in the insolubilized glue, is made into a darker pigment. This is done by reducing it to silver with a developer as follows:

EXAMPLE 5.—*Developer solution*

	Parts by weight
Hydroquinone	35
Sodium sulfite (anhydrous)	100
Sodium carbonate (monohydrate)	35
Water	11,350

The washed print is immersed in a bath of the developer until the black image of silver is formed. The print is then washed free from developer and dried, leaving the grit layer exposed for marking thereon with ink or pencil. Even pencil will make a line sufficiently dark to print "heavy" through the "tracing."

The foregoing and other procedures are here presented with reference to compositions illustrated, or their substitutes or particularly as varied.

PROCEDURE A

Tracing cloth is treated with No. 1 composition to transparentize and waterproof from each side. One face is then coated with No. 2 composition, and then with No. 4.

PROCEDURE B

Tracing cloth is coated on the face with No. 1 or equivalent (which need not be waterproofing), then on the back with No. 3, then on the face with No. 2 and then No. 4.

PROCEDURE C

Tracing cloth is coated on face and back with No. 3, then on the face with No. 2, and then No. 4. In this case there is no transparentizing effect. This is shown in Fig. 3.

PROCEDURE D

Tracing cloth is coated on back with No. 3, then on face with No. 2, then with No. 4. No transparentizing results. This is shown in Fig. 4.

PROCEDURE E

Tracing cloth is coated on the back with No. 1, then on the face with No. 2, then with No. 4. This is shown in Fig. 4.

Other sheets may be substituted in the above for the tracing cloth sheets. However, it is preferable to use at least one transparentizing coat against the base sheet. It is also preferable to carry the grit in a composition which lacks transparentizing agent, in order to assure better adherence of the emulsion coat No. 4.

From the foregoing it is to be observed that the essential part of the invention may be all on one side of the sheet. The base is waterproofed by a coat which is designed not to detransparentize it, and which even increases the transparency. Then a grit-coat is applied over it of such character that it will permit the emulsion coat to be applied. Reference is made to Examples 1 and 2, to note that the composition of Example 1 is anhydrous, while in Example 2 the solvent has an aqueous component. The coat formed from Example 1 is designed to resist solution by solvent action of composition of Example 2. And in turn the grit-coat is designed to resist alteration by the emulsion coat. These relationships are of course practical ones for the conditions encountered, and it is not intended to signify that the relation expressed is absolute.

In our co-filed application Serial No. 283,376, filed July 8, 1939, there is described a tracing sheet having a grit coat, which may or may not have a back-coat. In said application the grit is combined in the so-called transparentizing composition. Such a sheet may serve as a basis for application of a removable emulsion coating as herein described. In the event that the grit-coat is too oily for good adherence of the emulsion, any intermediate sizing coat may be applied, which is thin, or removable with the emulsion. A very thin coat of shellac may thus be used, which is merely to provide anchorage for the emulsion coat.

Various other changes and modifications of the invention are contemplated, such for example as

the modifications of the transparentizing composition which are shown in the said co-filed application. These and other variations are contemplated as falling within the scope of the appended claims.

We claim:

1. The method of making a transparency which comprises coacting a transparentizable base sheet with a coating composition containing a coating base and a transparentizing agent which is non-solvent toward said coating base to provide a transparent sheet, coating onto said coat a second composition which is a non-solvent for the base of the first coat, which contains a suspended grit, and which dries to a waterproof coat, and applying over said coat a light-sensitive aqueous composition of the chromate-glue type in wnich a pigment-forming substance is suspended.

2. The method of making a light-sensitive transparency which comprises coating a transparentized base sheet with a coating composition containing a coating base and a transparentizing agent for said base sheet which agent is non-solvent toward said coating base to provide a surface coat and preserve transparency in said base sheet, applying on said coat a waterproofing coating composition including a grit to provide a grit-surface for drawing which is waterproof, and applying to the grit-coat a light-sensitive coat of the chromate-glue type in which a pigment-forming substance is suspended.

3. The method of making a light-sensitive transparency which comprises coating a transparentized base sheet with a coating composition containing a coating base and a transparentizing agent for said base sheet which agent is non-solvent toward said coating base to provide a surface coat and preserve transparency in said base sheet, applying a waterproofing composition to the other side of said base sheet to provide a waterproof coat thereon, applying to the first coat a waterproofing coating composition containing grit to provide a waterproof grit-surface for drawing, and applying to the grit-coat a light-sensitive coat of the chromate-glue type in which a pigment-forming substance is suspended.

4. The method of making photo-tracing sheets which comprises applying to a surface of transparentized filled cloth a coating composition containing a coating base and a transparentizing agent for the filled cloth which agent is non-solvent toward said coating base to provide a coat on the cloth and preserve transparency in said cloth, applying to said coat a waterproofing coating composition containing grit to provide a waterproof grit-surface for drawing, and applying on said grit-surface a light-sensitive aqueous composition of the chromate-glue type containing an image-forming pigment.

5. The method of making photo-tracing sheets which comprises applying to each surface of a transparentized filled cloth a waterproofing coating composition to provide a waterproof coat on each side, applying to one of said coats a waterproofing coating composition containing grit to provide a waterproof drawing surface, the second applied composition being non-solvent of the base of the coat on which it is applied, and applying on said grit-surface a light-sensitive aqueous composition of the chromate-glue type containing an image-forming pigment.

6. The process of claim 5 in which at least one of the compositions applied to the sides of the cloth has a coating base and a transparentizing agent for the filled cloth which agent is non-solvent toward the said coating base.

7. A light-sensitive transparency comprising a transparent base sheet presenting at one surface a waterproof coat which contains a coating base and a transparentizing agent for the base sheet, which agent is non-solvent toward said last-mentioned coating base, and presenting at the other surface a light-sensitive coat of the chromate-glue type containing an image forming pigment, and beneath said coat a waterproof coat deposited from a coating composition containing a coating base and grit to give a coat having grit throughout its depth and a grit surface for drawing, the sensitive coat where struck by light being resistant to removal by water washing and being readily removable by a water-wash where protected from light.

8. A light-sensitive transparency comprising a transparent base sheet presenting at the surface a light-sensitive coat of the chromate-glue type containing an image forming pigment, and beneath said coat a waterproof coat containing grit to give a drawing surface, the first coat where struck by light being resistant to removal by water washing and being readily removable by a water-wash where protected from light, and adjacent to and carrying said second coat, a third coat in contact with the base sheet, said third coat carrying a coating base and a transparentizing agent for the base sheet which agent is non-solvent toward said coating base.

9. The product of claim 8 wherein the other face of the base sheet has a waterproof coat.

10. The product of claim 8 wherein the other face of the base sheet has a waterproof coat, which contains a coating base and a transparentizing agent for the base sheet which agent is non-solvent toward said last mentioned coating base.

11. A sensitized transparent sheet comprising an oil-transparentized base sheet, a waterproofing film thereon comprising a coating base and an oil therein which is non-solvent toward said coating base, a waterproof film on the first film having a distinct interface between the films, and a sensitized hydrophilic coat anchored to said second film.

12. A sensitized transparency having at one surface thereof a light-sensitive layer in a hydrophilic colloid base, a waterproof layer beneath said colloid layer which is non-repellant to application of the said colloid in an aqueous dispersion, a water-repellant water-proof layer adjacent said non-repellant layer and forming therewith a distinct interface, said water-repellant waterproof layer being on the surface of a transparency.

13. The product of claim 12 in which a grit is incorporated in the non-repellant layer to provide a tooth for a drawing surface upon removal of the said colloid layer.

14. The method of making a light-sensitive transparency which comprises applying on an oily water-repellant surface of an oil-containing waterproof soluble base of a transparency a liquid coating composition containing in a volatile solvent, a solid content adapted to form a residual translucent coat which is non-repellant to an aqueous suspension of a hydrophilic colloid, said composition being non-solvent toward the said soluble base providing said water-repellant surface, evaporating the volatile solvent whereby to form a waterproof coat having non-repellency toward an aqueous composition, applying to said

coat an aqueous composition having a hydrophilic colloid base adapted to be dried to a light-sensitive layer, and drying the aqueous composition.

15. The process of claim 14 wherein a grit is incorporated in the said non-solvent composition to give tooth for drawing to the coat therefrom after removal of the hydrophilic colloid.

16. The method of sensitizing a waterproof transparency which exhibits repellency toward an aqueous coating composition, which comprises forming a waterproof coat thereon by application of a liquid coating composition which is non-solvent to the base material providing said surface of said transparency and which contains a solid content capable of forming a coat which is non-repellant to an aqueous composition, evaporating the solvent of said composition to form said coat, applying an aqueous composition capable of drying to a light-sensitive coat, and drying out the water to provide the light sensitive coat.

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