

# UNITED STATES PATENT OFFICE.

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IMPROVEMENT IN THE MODE OF RENDERING FABRICS WATER-PROOF.

Specification forming part of Letters Patent No. 1,997, dated March 3, 1841.

*To all whom it may concern:*

Be it known that I, GEORGE JOHN NEWBERRY, a citizen of the United States of America, and now residing at Cripplegate Buildings, in the city of London, manufacturer, have invented or discovered a new and useful invention of certain Improvements in Rendering Silk, Cotton, Woolen, Linen, and other Fabrics Water-Proof; and I do hereby declare that the following is a full and exact description thereof.

My improvements in rendering silk, cotton, woolen, linen, and other fabrics water-proof consists in an improved mode, manner, or method of rendering such fabrics water-proof, and is effected by using drying-oils and oil compositions, varnishes, or other suitable composition for this purpose in such a way that one side of the fabric, when finished, presents an appearance unimpaired or but little altered by the process of waterproofing, and therefore keeps its original appearance, or nearly so, and this I effect by applying siccative or drying oils and compositions in such a manner that when finished the appearance of one side only of the texture is altered—that is to say, the oil or paint or water-proof composition coats or covers the one side, while it does not cover or injure the appearance of the other side, or but little so.

In order to make myself and my improved mode or method of waterproofing fabrics more clearly understood, I will first describe the same and different modifications thereof, and then how I produce damask patterns or designs thereon.

I would here make the following preliminary remarks. There are several well-known methods of waterproofing fabrics by means of siccative oils or siccative compositions, such as I intend to apply for this purpose in my improved mode, manner, or method. For instance, one well-known method of applying drying-oils and oil-paints and oil-varnishes to textures is to spread or cover the surface of the fabric with a thick or stiff coating of material, as a mixture of drying-oils, metallic oxides, and lamp-black or ocher, or other pigment or suitable body, and which is employed chiefly in the process of making floor-cloth, table-baize, cart-covers, &c. The other is simply by saturating the fabric with the said oil or oil-paint, or oil-japan, and allowing it to

dry, as in the manner usually adopted in the making of ordinary or common oiled silk.

To preserve the original appearance of the fabrics on the one side while the other shall be completely coated with the water proof composition has been a desideratum for a long time. Various plans have been tried to accomplish this object, such as wetting with water the fabric or texture intended to be water-proofed before spreading the stiff oil-color or waterproofing composition on the same—as, for instance, in the making of oil-baize table-covers, where the ordinary process is to give the textures a coating on the one side of size or other gelatinous body, with a portion of treacle or other soluble matter intermixed with it, and afterward spreading over the other side the oil color or varnish. Another well-known process is the saturating the texture with size color or strong starch or size or such like matters, and then oiling or covering with varnishes the other side, by which means the capillary absorption which the fabric would otherwise have is overcome by the saturation, while the waterproofing coating remains and dries on the other side. Another method is to mix gelatine or other extraneous matters with the oil or varnishes, so as to remove its staining and percolating properties at the time of applying the same to the textures; but these means are imperfect, for if stiff color is used and spread on one side the more fluid portions of the mixture are withdrawn and dry in stains on the other side of the textures, after the manner in which elaine will leave the stearine on pressing fat suet between bibulous paper; and when the texture to be water-proofed is saturated with water, then the oil-paint or other composition cannot take a sufficiently firm hold of the side of the texture it is applied to, and is still apt to go through the fabric and show on the other side, caused by the pressure necessary to spread so thick a material as must be used, and the texture must be kept saturated with aqueous matter until the oily substance is dry, and when dried it is of but little use as a water-proof, and is easily rubbed off, not having sufficient hold of the fabric of the texture.

The improved mode, manner, or method of waterproofing fabrics I employ, and which forms the subject of my improvements or in-



vention, is to saturate the texture completely with the composition I intend shall form the coating, covering, or waterproofing on one side only and exposing that surface only in such way to the action of the atmosphere or artificial heat that the said one side only shall become coated with a dry membranous stratum or pellicle of the composition, while during the process of drying or coating or covering the said one side the other or reverse side is wholly or partially protected from becoming dry or hardened, and which is effected by preventing the action of the atmosphere or artificial heat thereon. At this stage of the process—that is, when the one side is dry and the other yet moist from having been covered by other substances, and thereby protected from the action of the air or heat—the moist or unhardened side of the texture may be washed and cleansed or cleared on this said undried side by means of spirits of turpentine or other suitable liquid, and then hung up to dry, and by evaporation lose the odor of both the waterproofing material for the one side and the cleansing medium for the other side. This process may be repeated if the membranous stratum or pellicle left on the one side is not quite water-proof by the first operation; or the said waterproof coating may be thickened or strengthened afterward, if thought desirable, by repeated coats of paint, oil, varnish, or other compositions laid on by a brush or other means. I wish it therefore to be understood that what I consider my claim to these improvements in rendering fabrics water-proof is the saturating woven fabrics and fibrous textures with siccative oils, oil-paints, oil-japans, oil-varnishes, and other suitable compositions and the drying the same thereon as a coating or covering or pellicle on one side of the textures only by various methods to be hereinafter explained, at the same time keeping the other side in any undried state, and then washing or clearing this other unhardened or moist side of the fabric or texture from the said siccative matters by means of spirits of turpentine or other suitable liquids.

Having stated the nature and object of my invention, I will proceed to explain my improved methods of preventing the one side of saturated fabric from drying and of preventing the drying of the other side, or that to be left coated or covered by a pellicle, and which I consider to be new and peculiar.

I would here remark that drying oils and varnishes or siccative compounds of which drying-oils form an important part it is known will "skin over," as it is commonly termed, or dry on the surface, while the under part remains in the liquid state, if in any quantity, as in a jar or vessel, for months or even years. This pellicle I have found by experiment is very thin for several days. I determined to apply this effect of nature to the waterproofing of texture or fabrics in the following way: First, I strained a portion of silk on a frame and allowed it to float on a bath of drying-oil

so as to be perfectly even with the surface, scarcely touching it, without being immersed. In a few hours I took up the frame. The upper surface was perfectly dry or hardened and coated with a thin pellicle or film of the oil. I then washed the free oil away from the under side with spirits of turpentine, and found the said coating or pellicle on the upper side firmly fixed on that side which had been exposed to the air, and the other side of the fabric not impaired, or but little so, in its appearance or color. Therefore one method by which my improved mode, method, or process may be carried into effect is to use oil-baths—about a quarter or half an inch deep will be found sufficient—of proper dimensions to allow the frame containing the strained silk or fabric to float thereon, the upper surface of the fabric being left exposed to the action of the atmosphere or artificial heat.

Another method or modification of process of carrying my improvements into effect is as follows—viz., by merely laying the saturated fabric on a slab of slate or stone or metal or other surface or material non-absorbent to oils or such matters; and this I consider a more simple and convenient method of effecting the objects of my improvements.

The non-absorbent surfaces I prefer to use are tables of sufficient length and breadth for the fabric intended to be waterproofed, and may be made of wood and rendered non-absorbent by coating them with thin glue or varnish or other suitable material, and when this coating is dry and hard and seasoned I take the waterproofing composition—that is, oil or oil-paint or other suitable matters—and with a brush cover the table evenly with a coating of the waterproofing composition about as thick as a painter generally covers a wall or partition with oil-paint. I then take the fabric (it being previously coiled on a roller or round rod) and place it at one end of the table, and then unroll the fabric so that it shall cover evenly the table or surface coated by the siccative composition, and if the fabric is thin or of fine texture, as silk goods, it will be by the paint already laid on the table or surface completely saturated.

Should the fabric not lie evenly or close to the table or surface in all parts by merely rolling it thereon, I press it down or cause it to lie in close contact by means of the hands of the workman, and smooth out the wrinkles and air bubbles or cells by drawing the palm of the hand over the fabric from the middle toward the sides, or by rollers or scrapers, and by this means I also regulate the quantity of oil or siccative composition, so as to get an even quantity over the whole surface.

Should there be any pucker in the fabric, it may be overcome by straining the goods and retaining the same by pins stuck through the selvages into the table.

The time required for drying, or rather for obtaining the pellicle surface or thin coating or covering, depends on the nature of the oil



compositions or waterproofing material employed. In summer temperature the ordinary boiled linseed-oil takes about ten hours; but this may be ascertained by touching the surface with the finger from time to time, the drying process being continued until the outer surface of the material used loses its tackiness or adhesiveness, or, in other words, until the pellicle is properly obtained.

It is not positively necessary that the tables or surfaces should be placed horizontally, although I prefer to use them so; neither that the silk or fabric should be spread or laid on the upper side of the table or non-absorbing surface. For instance, in order to economize room, I sometimes make the table with both its under and upper surfaces prepared with the non-absorbent coating, and then spread the texture first over one side of the board, then around its end, which is properly shaped and prepared with the non-absorbent coating, and continue spreading it over the opposite side, by which means I am enabled to effect the waterproofing of double the length of fabric without occupying more space.

I would here remark that by mixing whitening or pipe-clay or flour or other extraneous matters with the oils or varnishes or compositions they may be thickened to such a degree as to prevent their running to the bottom edge of the table, or, in other words, following the inclination of their gravity. The table or surface may then be placed at any angle, or perpendicularly, if desired, and the texture dried in this situation, which method will further economize space in the manufactory.

Another variation of the mode or method of carrying my invention or improvements into effect is to strain two pieces of fabric on a stretching-frame such as is commonly used by calico-printers and cloth-dressers, so that two of their surfaces are placed evenly and closely in contact together, and I then saturate or paint them with oil or other waterproofing material while in that position. I place the frame horizontally if a thin drying-oil composition or material is used, and if the material is of sufficient consistence to prevent its running to the edges or ends it may be placed perpendicularly. By this method of operation the upper and under or the outer sides will become dry or hardened, while the two inner surfaces, or those in contact will be left moist, or, in other words, the waterproofing material between those surfaces will not be allowed to dry or form a pellicle by the action of the atmosphere or artificial heat applied; and when the two outer surfaces are dry, or the pellicle surface obtained thereon, the two pieces of fabric may be taken apart and the siccative composition which has not become hardened or dried removed by means of spirits of turpentine or other liquids.

The object of my invention being to prevent the oil or other siccative composition drying on both sides of the fabric, I shall describe another way of effecting it—viz., by straining out

the silk or fabric singly on or in a frame, then perfectly saturating it with any drying oil or paint or other such waterproofing composition, and when it is beginning to set or harden on both sides—that is, when the pellicle is just formed and is yet extremely tender—I scrape the oil or composition from one side without disturbing the pellicle so formed on the other, and give the scraped side a new coating of oil or paint of some composition which hardens or dries less rapidly than the other—for example, unboiled linseed-oil. By this method the one side will get dry or hard, while the other remains moist and capable of being washed clean by means of spirits of turpentine or other suitable liquids, as before stated.

Another modification of waterproofing by my improved process is to strain the fabric or texture on or in a frame in the way last described and give it a coating or covering on both sides and thoroughly saturate it with inspissated oil or composition, and when such coating is just beginning to set, but while still capable of being washed off, a coat of plain linseed-oil, thickened with flour or other suitable body, is to be laid carefully on one surface without disturbing the first coating of paint or thickened oil; and this latter coating is to be of sufficient thickness to protect it—that is, the composition or inspissated oil first applied—from the action of the air; and when the other or reverse side of the fabric is dry, or the pellicle surface sufficiently formed, then these two coatings of materials on the one or protected side may be removed by cleansing the surface with spirits of turpentine, as before stated.

Another method of carrying my invention into effect is by giving the texture or fabric a complete saturation of oil-paint so compounded as to take a long time to dry, or which will not dry readily without the addition of metallic oxides—as, for example, linseed-oil. This oil I use of a tolerable thick consistency by the addition of pigments and brush it well into the fabric. I then take the metallic oxide in its dry state, after being ground to an impalpable or very fine powder, and sift or distribute a small quantity evenly and equally over one side of the fabric only. By these means one side will be caused to dry before the other, and thus I am enabled to preserve the other side undried, so as to be washed, as before. Another method which may be employed is to thicken or inspissate the drying-oil with lamp-black or other suitable substance, so as to bring it to a buttery consistence, and then apply it to the fabrics on each side, but with coatings of unequal thickness, which may be done by a brush or other means in such manner that no more than is intended to form the permanent coating shall be laid on one side, while the other or temporary coating is laid on sufficiently thick that, although its skin over or forms a pellicle on its outer surface, yet its under or within stratum is not dry, and therefore this temporary coating may be readily scraped off,



which will allow this side of the fabric to be cleaned by means of spirits of turpentine or other means, as before stated.

Another method of obtaining this effect of preventing the one coating from drying while the other is allowed to do so is by using another description of covering, such as a second texture or a painted or oiled cloth or other airtight fabric or material placed in contact with the one surface in such manner as to keep the siccative composition on the one side moist and loose from the texture while the other is drying or the pellicle is being formed and fixed upon it.

I would here remark that in applying the siccative oil or composition to the side of the fabric which is to have the permanent pellicle formed upon it it must not be laid on so thick that the pellicle, when formed, shall be loose from the surface, which will be the case when too much of the material is spread on it. Care should be taken to prevent this effect, for the permanent pellicle should, as it is forming and drying or hardening, take hold of or incorporate itself with the fibers of the fabric, so that it may firmly adhere thereto.

Having thus described my invention and several different modes, modifications, or methods of carrying my improvements into effect, I wish it to be understood that what I claim is the application of any drying-oils, siccative compositions, or varnishes which have a drying or hardening property for the purpose of saturating the texture, in the first place, and then by artificial means to cover one side of the texture, so that this side shall remain undried while the other dries, hardens, or, in other words, has a pellicle formed on that surface which is exposed to the direct action of the air or artificial heat, and which pellicle is firmly incorporated with or attached to that surface, the other side being protected from the action of the air or heat, which enables the moist part or coating to be cleared away, so as to leave the texture in its original appearance or its surface unimpaired, or nearly so.

Having thus fully stated the nature of my improved manner or method of waterproofing fabrics and various modifications or processes for effecting the same, I will proceed to explain and describe my improved method of producing damask patterns or designs on silks and other textures or fabrics by means of the above-described method of drying or coating and waterproofing one surface while the other is wholly or partially protected from so doing—that is to say, first, instead of having a plain table or surface of slate or of wood placed in contact with that side of the fabric part of which is only partially to be protected from the drying action of the air or heat, I lay or spread the saturated silk or fabric upon a surface or table or block which has a pattern formed upon it, such pattern being sufficiently countersunk or raised—say about the depth of one-eighth of an inch or more—after the manner of ordinary calico or paper stainer's pattern-block. The

raised parts of this pattern-block or table, being placed in close contact with one side of the saturated silk or fabric—that is, the one intended to have the pattern formed upon it and the fabric stretched over it—the indented or sunken parts, recesses, or interstices of the pattern not being filled with the composition will allow the waterproofing material to harden or become pellicled on both sides in some parts, while the raised parts will prevent such effect taking place where in contact with the fabric. After the texture has been spread or stretched over the pattern-block, if required, I again cover the outer surface with paints or oils or other compositions. The saturated fabric should be carefully laid or rolled closely and evenly upon the raised parts of the table or pattern-block, care being taken that every part of the upper surface of the raised parts shall be in close contact with the silk or other texture. The drying or hardening process may then go on until the pellicle is formed, as before described, and when the required parts of the surfaces are dried or hardened I remove the loose or undried parts from the underside, or such parts as have been in contact with the upper surface of the pattern, by means of spirits of turpentine or other effects, as before described.

It will be seen that according to the color of the paint or waterproofing material used and the original color of the silk or fabric so will a variety of contrasts and patterns, either colored or plain, be produced, it being easy by means of the colors of the fabric and the colors of the waterproofing material used, either on the one or the other side of the fabric, to produce a great variety of ornamental patterns or devices.

Another modification of producing the same effect is by using perforated pattern plates and boards, hardened oil-cloth, or other suitable laminated material, and placing the same against one side only of the fabric, or between two surfaces of silk or other texture stretched on a frame, as before named.

Having now described my improvements in waterproofing fabrics, I wish it to be understood that I do not confine myself to any particular substance or material for backing, covering, or preventing the drying of one side of a saturated texture, either wholly or partially. Neither do I intend to confine myself to any particular siccative composition to be used for saturating and waterproofing the texture or fabric, although I have hitherto found drying-oils and oil compositions to answer best for this improved manner or method of waterproofing.

I therefore claim as new and useful—

1. The improved modes, methods, processes, or modifications above described of applying substances to such saturated textures, so as to prevent one surface thereof from drying, hardening, or forming a pellicle thereon, while the other is allowed so to do by the action of the atmosphere or artificial heat to which it is exposed, evaporating a portion of the aqueous or volatile parts of the oils or compositions.



and then afterward clearing away the moist parts by the agency of spirits of turpentine or other suitable liquid.

2. The mode, manner, or process of producing damask patterns or designs on the surface of such fabrics in the way or manner above stated.

In witness whereof I, the said GEORGE JOHN

NEWBERY, have hereunto set my hand and seal this 23d day of November, in the year of our Lord 1840.

GEORGE JOHN NEWBERY. [I. s.]

Witnesses:

J. W. MOFFATT,

F. WALKDEN,

*Clerks to Newton & Berry.*