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WATERPROOF FABRIC AND METHOD OF MAKING THE SAME

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This invention relates to processes for waterproofing cloth, fabric, or the like and has a special relation to a new and improved process for the production of a waterproof, paraffined cloth which will be absolutely water-resistant, air tight, durable for many purposes and especially adapted for use as a substitute for window glass or the like.

There are now paraffined cloths on the market but most of these are not absolutely water proof, and will readily deteriorate when submerged in water or subjected to the elements for any length of time. The reason for this is that the minute interstices between the threads are not thoroughly sealed by paraffin, neither are the fibres of the threads thoroughly impregnated with paraffin. The result is that the water gets into the fibres causing them to swell, thus causing a breaking away of the paraffin surrounding the minute fibres, making the fabric no longer water proof and deterioration and decay soon follows.

It is the main object of this invention to provide a new and improved process for waterproofing cloth or fabric by paraffin or the like in such a manner that each minute fibre of the cloth will be thoroughly and completely impregnated with paraffin, as well as completely and thoroughly filling each and every space or interstice between the threads of the cloth or fabric.

Another object of this invention is to provide a waterproof paraffined cloth or fabric which will be absolutely water proof when submerged in water, air tight, weather resistant, durable and which may be adapted for several uses.

A further object of this invention is to provide a new and improved process of making a water-proof paraffin cloth or fabric, in which the cloth or fabric to be treated is first calendered and then filled and paraffined without any further calendering.

A still further object of this invention is to provide a new and improved process for making water proof paraffined cloth or fabric in which the cloth or fabric to be treated is first bleached, then dried, then calendered, then filled, then dried again, then paraffined, and then cooled.

A still further object of this invention is to provide a new and improved process of water proofing cloth or fabric, in which the cloth or fabric is treated with paraffin or the like, said cloth or fabric being calendered prior to but not after it is filled and paraffined.

Other objects and advantages of the invention will become apparent during the course of the following description.

The cloth used in my invention may be a cotton fabric or the like, which may be woven in the usual way, and having approximately 60 threads each way to the square inch, although a greater or smaller number of threads to the square inch may be employed with satisfactory results.

The first step in my new and improved process is to bleach the cloth or fabric, which I accomplish in the following manner: The cloth or fabric to be treated is immersed in a tank of water containing a solution of caustic soda and is boiled for a period of eight hours or more, from which it is then removed and thoroughly washed. The cloth is then steeped in a chlorine bath, the chlorine having the tendency to make the cloth more absorbent. The process of steeping the cloth in the chlorine varies considerably with the temperature and humidity of the air. The cloth is then washed thoroughly and is passed through a very light solution of muriatic acid or sulphuric acid in water, preferably the former, after which it is again thoroughly washed and then dried in any well known manner, such for example, as passing the cloth over a series of heated cylinders, in an endless bolt. Obviously, the method of bleaching the cloth or fabric may be accomplished in some other manner, but I have found the method hereinbefore described to be the most satisfactory and to give the best results.

The next or second step in my new and improved process is to calender the cloth, which may be accomplished in one of several ways. However, the method I prefer is to slightly dampen the cloth, or to leave the cloth slightly damp as it is taken from the drying cylinders, and then pass the cloth

through a series of calendering rollers of any well known construction. I have found that by using a fibre roller opposite a hot iron roller with a slight amount of pressure on the rollers, very satisfactory results are obtained. The pressure on the rollers has a tendency, of course, to compact the fibres in the cloth and to smoothen and give a gloss to the surface of the cloth. If desired, the rollers may be made to rotate at different rates of speed, also the amount of pressure on the rollers may vary, this depending on the dampness of the cloth or the amount of bleaching. However, the calendering is usually light, and the cloth may be dried in calendering by the use of heated rollers. Obviously, cold rollers may be used and the cloth may be calendered while in a damp condition. If desired, starch may be added before calendering, to give the cloth more rigidity, this however, is not absoluately necessary.

The next or third step in my process is to fill the cloth or fabric, which may be done in one of several ways, I have found, however, that the following formula for a filler and the following method for filling the cloth, give the best results. I thoroughly mix together in water a mixture of wheat flour, corn starch, and mica or French talc, to form a paste of approximately the same consistency as plaster mortar. The percentages of the ingredients which give the best results I have found to be as follows:

	Per cent
Wheat flour	20
Corn starch	20
Mica or French talc	60

If a bluish color is desired enough bluing may be added to the paste to give the desired color.

The starch is for the purpose of stiffening the cloth, while the flour acts as a carrier for the mineral filling. As the starch and flour mix together easily and thoroughly, and do not separate, they make a very good foundation for the mineral filling which may be either mica, French talc, powdered limestone, or common clay. Obviously, the filler may be made up from different ingredients and in different proportions, also the mineral content of the filler may be substitutd with a starch or flour filler, or vice versa, or other ingredients may be substituted, provided they do not affect seriously the durability and translucency of the finished product. I have found, however, that the ingredients given above with their percentages as given, produce the best results.

Th filling paste is then placed in a vat, and the cloth which has already been calendered is passed therethrough. The paste is thoroughly mixed by means of paddles or the like and is driven into the cloth during this mixing by these paddles. The cloth is then removed from the vat, and the surplus filling removed or scraped therefrom by passing the cloth between a rotatable cylinder and a blade, or between a set of blades, the former means of scraping or removing the excess filling, however, is preferred. In filling the cloth in this manner and then scraping it, each of the minute fibres of the cloth as well as all of the interstices between the threads is thoroughly and completely filled and impregnated with the filler. The filled cloth is then passed over heated rollers or cylinders which completely dry the same. I have found steam heated rollers to be most satisfactory for drying the cloth at this time. The filled cloth is now substantially air tight and comprises approximately 35% of the gross weight of the cloth.

The next and last step in my improved process is to paraffin the filled cloth to make the same absolutely water proof, translucent, weather resistant, and durable. This may be accomplished in one of several ways, but I have found the following method to be the most satisfactory and to give the best results: The filled cloth, after being thoroughly dried is submerged in a bath of melted paraffin, preferably of a high melting point (134 to 136 degrees F.) and left in this paraffin bath for approximately six hours. This time is sufficient to thoroughly and completely saturate and impregnate the cotton fibres of the cloth, as well as the filling therein, on and between the threads. I have obtained the best results when the temperature of the paraffin has been approximately 150 degrees F. The cloth is then withdrawn from the paraffin bath, the excess paraffin scraped off before it is allowed to cool, and the finished product is then cooled in any well known manner, such for example, as by passing the same between a series of fans provided therefor below and above the cloth. After cooling, the cloth may be rolled into rolls or bolts. At this time the paraffin comprises approximately 55% of the gross weight of the cloth.

If desired, the cloth may be put through the paraffin bath a second time, which will tend to make the finished product somewhat more translucent. Obviously, other ingredients may be added to or substituted for the paraffin, such for example as wax or the like, provided, of course, these ingredients will not affect the weather resisting properties of the finished product.

By employing my new and improved process in which the cloth is calendered prior to filling but not after filling, I have found that I obtain a finished product which is absolutely water proof and weather resistant, since it is more thoroughly and completely saturated and impregnated with the paraffin. This being true for the reason that by not calendering the filled cloth, the filling is left more pervious to the paraffin and per-

mits the paraffin to impregnate the same thoroughly as well as permitting the paraffin to completely surround and impregnate each minute fibre in the cloth.

The finished product is adapted for use in several ways since it is water proof, weather resistant, durable, and has the characteristics of permitting the passage of a sufficient amount of ultra-violet rays to retain health, and the passage of infra red rays to stimulate growth in hot houses, health rooms, and the like. It is especially useful because of these properties as a substitute for glass, being very desirable for that purpose as it is flexible, as well as being unbreakable.

In the practice of the invention certain equivalents may be used to some extent in place of those named. I therefore desire the benefit of a reasonable range of equivalents with respct to the appended claims.

What I claim and desire to secure by Letters Patent of the United States is:—

1. The herein described method which consists in filling the fabric to be treated with a filler comprising wheat flour, corn starch and French talc, drying, and then submerging the said treated fabric in a bath of paraffin at a temperature of approximately 150 degrees Fahrenheit for a substantial period.

2. A water-proof paraffined cloth having the fibres of the threads and the interstices between the threads thereof completely and thoroughly filled with a mineral filler containing wheat flour, corn starch and French talc, the said cloth and filler being thoroughly and completely impregnated with paraffin of a relatively high melting point, said paraffin bath being maintained at a temperature of 150° Fahrenheit.

3. The herein described method which consists in steeping the fabric to be treated in a chlorine bath to make the same more absorbent, then filling the fabric, and then submerging the filled fabric which has been left pervious in a bath of paraffin of high melting point, said paraffin being maintained at a temperature of substantially 150 degrees Fahrenheit, and said fabric being submerged in said bath for a period of about approximately six hours.

In testimony whereof I affix my signature.

HAROLD WARP.