(Specimens.)

I. F. WILLIAMS.

WATERPROOFED TEXTILE FABRIC.

No. 296,263. Patented Apr. 1, 1884.

Fig. 1.

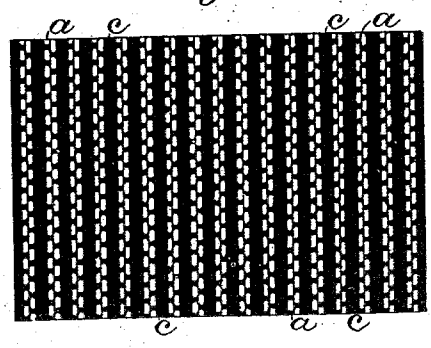


Fig. 2.

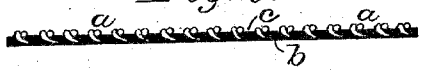


Fig. 3.

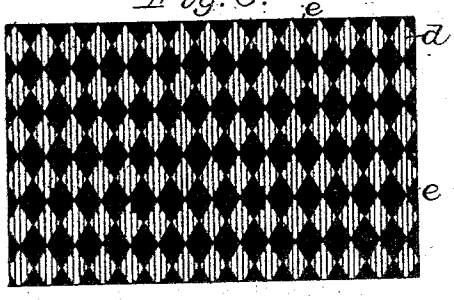


Fig. 4.

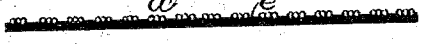


Fig. 5.



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WATERPROOFED TEXTILE FABRIC.

SPECIFICATION forming part of Letters Patent No. 296,263, dated April 1, 1884.

Application filed June 24, 1882. (Specimens.)

To all whom it may concern:

Be it known that I, ISAAC F. WILLIAMS, of Bristol, in the county of Bristol and State of Rhode Island, have invented certain new and useful Improvements in Waterproofed Textile Fabrics; and I do hereby declare that the following specification, taken in connection with the drawings furnished and forming a part thereof, is a clear, true, and complete description of my invention.

Waterproofed textile fabrics as heretofore produced are, so far as my knowledge extends, fairly embraced within two general classes, as follows: first, those wholly saturated or filled with waterproofing material or coated upon both sides thereof; second, those partially saturated or coated upon one side only. There is also a large class of compound fabrics embodying two or more thicknesses of textile fabric, solidly united—as, for instance, by the union of two or more thicknesses of fabrics belonging to either or both of the classes named; and it is to be understood that in the building up of such compound fabrics my novel fabric may be employed as an outside or finishing fabric, in connection with fabrics of either or both of the well-known varieties of fabrics to which I have referred. Goods of the first-named class are obviously deprived of the appearance and finish incident to their normal fibrous surface; and those of the second, while retaining their normal surface finish upon one side thereof, are deprived of that water-shedding capacity upon said fibrous surface which is incident to either side or surface of goods belonging to the first class.

My novel fabric differs from prior goods of either of the classes named, in that, although it is coated or saturated upon one side or surface, as with goods of the second class referred to, it is upon the opposite side or surface partially coated or saturated, and partially retained in its normal condition, thus providing for a surface effect similar to that in goods of the second class, accompanied with a water-shedding capacity more or less closely approximating to that of goods of the first class. In my fabrics the fibrous surface may be provided for in various ways, and in their production I can employ piece-goods readily attainable in open market, or goods specially manufactured for the purpose in various styles, as may from time to time be deemed desirable. For producing my best effects I prefer to employ that general class of goods which have a substantially plain back, and a front upon which there are raised lines, ribs, or figures, in which case the waterproofed or coated surfaces include the entire back and the sunken portions or background of the front, intervening between the raised lines, ribs, or figures. Comparatively desirable effects can, however, be obtained by using plain woven fabrics, the reserved fabric surfaces being in such case provided for by compression upon the portions to be saturated or coated upon both surfaces, and meantime leaving those portions whereat the fabric surfaces are desired practically free from compression during the application of the waterproofing matter.

To more particularly describe my invention I will refer to the accompanying drawings, in which Figure 1 is a front surface view of a piece of my novel water-proof fabric having raised lines or ribs. Fig. 2 is a sectional view of said fabric. Fig. 3 is a front surface view of a piece of my fabric having a series of lozenge-shaped figures thereon. Fig. 4 is a sectional view of the fabric, Fig. 3. Fig. 5 is a front surface of a piece of my fabric having a design embracing vines and flowers.

Various other styles of my fabrics might be here illustrated—as, for instance, such as may be termed the "basket-weave" or "ribbed diagonal;" but those shown are deemed sufficient for an ample illustration of my invention.

Referring to Figs. 1 and 2, the front surface of the fabric has straight and parallel raised lines or ribs *a*, and the rear surface or back, *b*, of the fabric is substantially plain or smooth. It is to the rear surface of my goods that the waterproofing matter is applied, and it is so incorporated into the body of the fabric as to extend through the same at all points between the ribs, so that the intervening surfaces, *c*, on the front of the fabric are substantially like the rear surface.

I do not limit myself to any special waterproofing material, except as specially indi-

cated in my claims, although I prefer caoutchouc to any other, and when that gum is employed it may or may not be combined with such mineral matter as is necessary for vulcanization. If the waterproofing matter be applied in solution, the quantity so applied should be such as will saturate only the main body of the fabric and leave the outer portions of the raised ribs substantially in their normal condition. If the water-proof matter is applied in plastic form, as with "calenders," as usually employed, the quantity of the compound and the pressure of the rolls are so graduated as to cause the compound to be forced from the rear side through to the front side of the fabric, between the ribs, but to leave the latter on their outer surfaces substantially free from compound.

Among the numerous waterproofing materials which may be employed, and which are well suited for use in accordance with the main feature of my invention, I will mention gutta-percha, linseed-oil, and the gums derived therefrom, and still other well-known materials may obviously be employed. The character of the ribbed fabrics suitable for my purpose may be extensively varied, and the ribs may be straight, as shown, or serpentine; but it is desirable that the texture of the main body of the fabric, including, of course, the intervening recessed portions, should not be too close to prevent the desired permeation by the waterproofing matter. Such fabrics may be woven or knit, and among the most useful fabrics which I have employed are ribbed stockinets.

The fabric shown in Figs. 3 and 4 has the same substantially plain back as the ribbed fabric described; but on its front surface it has numerous raised lozenge-shaped figures, *d*, and intervening sunken portions, *e*, corresponding in outline to the raised figures. This fabric is treated with the waterproofing compound, as before described, so that the rear surface and the sunken portions of the front surface are substantially alike, leaving the outer surfaces of the raised portions substantially in their normal condition. It will be readily seen that the character of these raised figures may be almost indefinitely varied, and in Fig. 5 I show a fabric embodying a floral design, (which may be developed in weaving in a manner well known,) wherein the figure is raised and the background *f* sunken, and this fabric is permeated by the waterproofing compound without affecting therewith the raised figures.

It is obvious that beautifully-varied effects can be produced—as, for instance, the textile fabric may be white or any other desirable color, or it may be woven or knit in mixed colors—and the groundwork or waterproofed outer surface produced in any one of a variety of colors in more or less striking contrast with the raised portions of the fabric.

The uses to which my novel fabrics are applied are obviously too varied to warrant a complete enumeration. As instances I will state that the ribbed fabric, Figs. 1 and 2, if of stockinet, is admirably adapted to the lining of rubber boots and shoes, thus affording in the main a cloth or fiber inside finish coupled with a desirable non-absorptive capacity. The ribbed goods, if woven, are, like the other varieties shown, variously adapted for use in the manufacture of many lines of water-proof clothing, carriage boots and covers, table-covers, carriage and boat cushions, and numerous other uses are equally obvious.

It will be seen that these novel fabrics have an exterior surface, which, so far as general appearance is concerned, is a cloth surface, while the recessed background has a waterproofed surface which corresponds to that of the rear surface, and therefore the exterior surface has a desirable water shedding or repellant capacity much greater than if the surface were wholly fibrous.

While I prefer to employ a textile fabric which in its normal condition has raised lines, ribs, or figures upon the front or outer surface thereof, I do not limit myself thereto, because, as hereinbefore indicated, I can employ plain woven fabrics for producing certain desirable effects—as, for instance, a plain fabric woven from slack-twisted soft-dressed large yarn is passed between calender-rolls—one plain and the other scored or otherwise recessed to afford the desired rib or figure—and the waterproofing matter is applied to the plain roll or the rear surface of the fabric in such condition and proportions as will, with the proper pressure upon the rolls, obviously cause the body of the fabric to be properly permeated therewith and to extend the same through, so as to occupy the background between the ribs or figures on the front side. The ribs or figures, which are in this case developed by the correspondingly-recessed roll, are sufficiently relieved from pressure to prevent their being permeated by the waterproofing matter, and enables them to retain their fibrous surfaces thus raised in substantially their normal condition.

I am of course aware whenever my novel fabric is employed as a component of a compound fabric—or, in other words, for instance, when it is to be united by vulcanization to another fabric applied to its rear surface—that the quantity of vulcanizable gum applied may be so slight as to render the single fabric not absolutely water-proof; but that would be unimportant, in view of the fact that the compound fabric thus produced would be practically water-proof.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The waterproofed knit or woven fabric, substantially as hereinbefore described, the same having raised ribs or figures free from waterproofing matter, and its rear surface and the recessed background for said raised ribs or

figures charged or coated with said waterproofing matter, as set forth.

2. The waterproofed knit or woven fabric, substantially as hereinbefore described, the same having raised ribs or figures on its front surface, and charged or coated with vulcanizable waterproofing material at the rear surface of said fabric and at the recessed portions only of the front surface, as set forth.

ISAAC F. WILLIAMS.

Witnesses:
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ANDREW R. TROTTER.