Feb. 12, 1935. J. E. MARBLE 1,991,168

WATERPROOF COVERAGE AND MATERIAL SUITABLE THEREFOR

Filed July 25, 1934

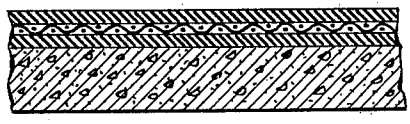

Fig. 1.

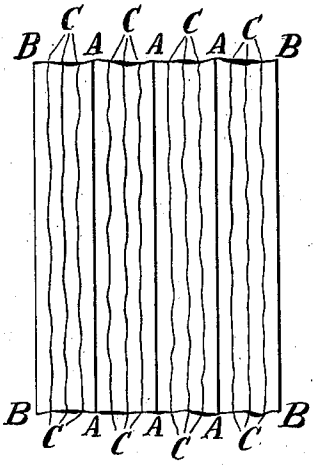

Fig. 2.

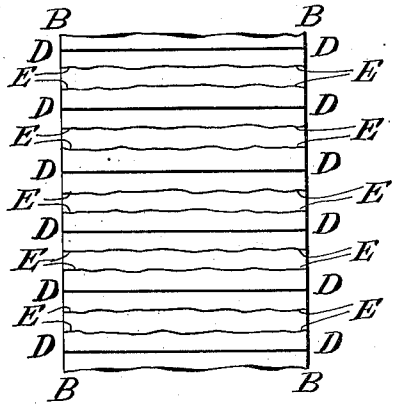

Fig. 3.

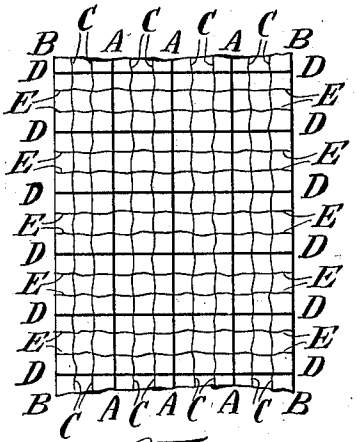

Fig. 4.

INVENTOR-
James E. Marble
BY
Thomas Freeman
his ATTORNEY-

Patented Feb. 12, 1935

1,991,168

UNITED STATES PATENT OFFICE

1,991,168

WATERPROOF COVERAGE AND MATERIAL SUITABLE THEREFOR

James E. Marble, Passaic, N. J.

Application July 25, 1934, Serial No. 736,824

12 Claims. (Cl. 154—50)

My invention relates to materials adapted for the production of waterproof effects for structural, roadway and other purposes and refers particularly to fabrics adaptable for these purposes.

Among the accepted methods for producing waterproof effects is the incorporation of fabrics between layers of a suitable waterproofing material, such as asphalt, coal tar, bituminous pitch &c.

In following the present processes for road purposes, as an example, a layer of asphalt is placed upon the prepared road bed, a layer of fabric usually saturated with a waterproofing material, such as asphalt, is laid thereon and upon this is laid a further coating of the waterproofing material, as asphalt, thus forming a waterproofing blanket. These operations are repeated as many times as are necessary to produce the desired result.

Ductility and stretchability are among the necessary attributes of a waterproofing blanket of the character described, in order that its continuity may be maintained under stresses set up by expansion and contraction, or by movements caused by loading, vibrating or other causes, and hence, the fabric employed should be of such a character as not to tear, or be disrupted, during these expansion and contraction movements due to changes of temperature, or during more or less, violent vibratory, or sudden, movements imparted to the waterproof coverage.

All concrete or masonry tunnels, building foundations, bridges, wing walls etc. some time during the life of the structure, crack through settlement or expansion and contraction. A waterproofing medium to be permanently effective must have a sufficiently great elongation or stretchability factor to bridge these cracks without rupture or it will not fulfill its purpose.

The amount of contraction and expansion to which the present employed fabrics can be submitted without rupture is dependent upon the physical properties of the fiber employed and upon such changes of weave formation which may be caused by a preliminary treatment or with a waterproofing material such as asphalt.

Waterproofing fabrics have been made for many years. Their ability to bridge masonry cracks have depended solely on the factor of elongation of the fibres from which the fabric was made. The elongation of cotton fibre has steadily decreased until it is now only 50% of what it was twenty (20) years ago. Hence waterproofing fabrics instead of being improved have become steadily less efficient.

The elongation factor of cotton, which fiber has been found most practical for this use, is low, and this is not appreciably increased by the asphalt treatment. Experience has shown that the fibers in the present employed fabrics frequently break because the expansion of the masonry surface waterproofed, under the conditions of use, is greater than the fiber of the waterproofing blanket can withstand.

It is evident that the longitudinal expansion of the waterproof coverage of a bridge road bed, or one of similar shape, is considerably greater than that of the transverse expansion, and hence, when the expansion of the masonry surface covered is greater than the elongation factor of the fibers of the waterproofing blanket they will break at the lines of broken cleavage of the masonry masses, allowing water to seep therethrough.

The greatest stress, therefore, is upon the longitudinal fibers of the fabric, that is, the warp threads of the fabric.

I have found means, however, by which this undue and damaging stress upon the warp, or longitudinal, threads of the fabric can be overcome, and by which the longitudinal stretch of the fabric can be many times increased over the normal elongation value of the fibers in the fabric, thus preventing a breaking of the warp threads even if the longitudinal expansion of the entire structure waterproofed is greater than the elongation factor of those fibers.

In the accompanying drawing illustrating one form of the fabric employed by me in my process and its application similar parts are designated by similar numerals.

Figure 1 is a cross-section of a waterproofed road bed, showing the various layers of materials employed.

Figure 2 is a diagrammatic plan view of a portion of a fabric employed in my invention, with the weft threads omitted.

Figure 3 is a diagrammatic view of a portion of a modified form of a fabric employed in my invention, in which the warp threads are omitted.

Figure 4 is a diagrammatic view of a modified form of a fabric employed in my invention.

The particular form and construction of fabric shown in Figure 2, consists of a plurality of warp threads, a plurality of which A, A are spaced from each other and are in the same taut condition as the selvage threads B, B.

The intermediate warp threads C, C, C, C posi-

tioned between the taut warp threads A, A, A are in loose, or non-taut, condition.

It is evident that the threads A, A, B, B will retain the fabric in condition for treatment, coating or saturation with a waterproofing material and for laying in the production of the waterproofing blanket, allowing the fabric to be processed, or laid in place on the structure to be waterproofed and pulled taut without putting any tension on the intermediate warp threads C, C, C, C.

If the waterproofing blanket containing a fabric of the character shown in Figure 2 be subjected to an expansion greater than the elongation factor of the threads A, A, B, B, these threads will break, but as the threads C, C will remain unbroken, the fabric will remain intact and retain its waterproofing property.

It is evident that the number of taut warp threads A, A and that the number and looseness of the threads C, C may be varied to suit the particular requirements demanded.

The same weave arrangement of weft threads may be employed as shown in Figure 3, having the taut threads D, D, and the loose threads E, E.

The fabric containing both taut and loose warp and weft threads, as shown in Figure 4, may also be employed.

In order to clearly and understandingly refer to the taut fibers and the loose fibers, I state in my specification and claims that the former, or taut, fibers are under greater tension than the latter, or loose, fibers.

It will thus be seen that my invention presents means whereby a fabric may be employed within layers of waterproofing material, the waterproofing material being expansible beyond the expansible limit of the taut fibers in the fabric without tearing, or disrupting, the main body of the fabric, thus retaining the waterproofing properties of the waterproofing blanket under such stress conditions.

I do not limit myself to the particular number or arrangement of fabric fibers as specifically shown and described, as these are given simply as a means for clearly describing my invention.

What I claim is:—

1. A waterproofed woven fabric consisting of warp threads and weft threads in which a plurality of threads are under greater tension than the remainder of said threads.

2. A waterproofed woven fabric consisting of warp threads and weft threads in which a plurality of warp threads are under greater tension than the remainder of said threads.

3. A waterproofed woven fabric consisting of warp threads and weft threads in which a plurality of warp threads are under greater tension than the remainder of said warp threads.

4. A waterproofed woven fabric consisting of warp threads and weft threads in which a plurality of spaced threads are under greater tension than the threads between said spaced threads.

5. A waterproofed woven fabric consisting of warp threads and weft threads in which a plurality of spaced warp threads are under greater tension than the threads between said spaced threads.

6. A waterproofed woven fabric consisting of warp threads and weft threads in which a plurality of spaced warp threads are under greater tension than the warp threads between said spaced threads.

7. A waterproof blanket consisting of a layer of waterproofed woven fabric between layers of waterproofing materials, said fabrics consisting of warp threads and weft threads in which a plurality of threads are under greater tension than the remainder of said threads.

8. A waterproof blanket consisting of a layer of waterproofed woven fabric between layers of waterproofing materials, said fabric consisting of warp threads and weft threads in which a plurality of warp threads are under greater tension than the remainder of said threads.

9. A waterproof blanket consisting of a layer of waterproofed woven fabric between layers of waterproofing materials, said fabric consisting of warp threads and weft threads in which a plurality of warp threads are under greater tension than the remainder of said warp threads.

10. A waterproof blanket consisting of a layer of waterproofed woven fabric between layers of waterproofing materials, said fabric consisting of warp threads and weft threads in which a plurality of spaced threads are under greater tension than the threads between said spaced threads.

11. A waterproof blanket consisting of a layer of waterproofed woven fabric between layers of waterproofing materials, said fabric consisting of warp threads and weft threads in which a plurality of spaced warp threads are under greater tension than the threads between said spaced threads.

12. A waterproof blanket consisting of a layer of waterproofed woven fabric between layers of waterproofing materials, said fabric consisting of warp threads and weft threads in which a plurality of spaced warp threads are under greater tension than the warp threads between said spaced threads.

JAMES E. MARBLE.