

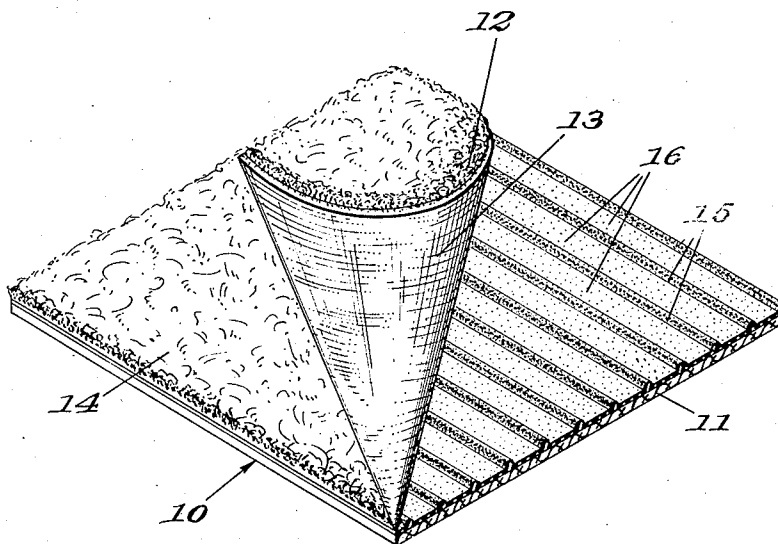
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LAMINATED LINING MATERIAL

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LAMINATED LINING MATERIAL

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5 Claims. (Cl. 154-46)

This invention relates to laminated lining materials and particularly to a laminated textile fabric which, although possessing many uses, is peculiarly adapted to the lining of shoe uppers.

5 The objects of the invention are to produce a material which is highly flexible when bent in one direction and stiff when bent in a direction normal thereto; to produce a combination lining which possesses a hitherto unattainable degree of breathability and yet maintain a secure, depend-
10 able adhesive bond; and, to permit the laminating process to proceed in a quick and expeditious manner. These and other objects of the invention will become apparent from the
15 specification and from the drawing in which the single figure illustrates a swatch of my improved combination lining showing one ply turned back to illustrate better the method of its construction.

20 When light leathers are used in shoes, it is customary to give the shoe a plump feeling and a neat appearance by the use of a "plumper" or "doubler". This usually is a sheet of textile material napped, as required, on one or on both
25 sides. In previous combination linings the doubler has been cemented to the shoe lining with any one of a large number of commercial doubling cements. Usually, the lining is made of any hard, dense, woven textile such as twill,
30 coutil, or in certain instances, leather, but when such a composition lining is assembled in the shoe upper it will be found that two very desirable features are lacking. First, such linings possess very low breathability because the cement
35 layer effectively blocks the passage of air through the fabric and, second, if sufficient cement is applied to supply a dependable bond, linings are equally stiff in all directions and give a "boardy" feeling to a light shoe. High breathability is
40 of great importance because the comfort of the wearer depends upon the rate at which moisture and air are transferred through the lining, but, because combination linings hitherto have been relatively impervious, it quite frequently happens
45 that the shoe manufacturer prefers to die out the doubler, the lining and the upper separately and to assemble all three prior to the lasting operation. In the manufacture of women's summer footwear, it is frequently desirable that
50 there be no box toe, but that the upper and lining together shall possess enough stiffness to maintain the shape and neat appearance of the shoe throughout its life.

I have discovered that it is possible to produce
55 a combination lining which has very material

stiffness when flexed in one direction and, yet, is extremely soft and flexible when bent in a direction normal thereto.

In carrying out my invention, I coat any suitable flexible sheet material with a cement according to the process which I have set forth in my United States application, Serial #649,340,
5 filed December 29, 1932, Patent No. 2,054,448, September 15, 1936, and I immediately apply thereover the plumper or doubler layer of napped
10 fabric.

To secure the best results from this process, it is necessary that the cement have a sufficiently high viscosity or plasticity so that it will not flow laterally when the doubler layer is applied,
15 but, this is a characteristic which is quite common in many commercial cements. A most satisfactory adhesive is a water dispersion containing five parts of casein and ten parts of rubber (dry weight). The stiffness may be controlled by
20 varying the relative proportion of casein or by adding glue. For example, a very stiff lining is produced by using a cement containing casein, five parts, rubber, ten parts, glue, five parts
25 (dry weight). Frequently, it is desirable to vulcanize the cement and this may be done if sulphur and accelerators are added to the dispersion in a manner which is now well known.

Referring to the figure, it will be seen that the combination lining 10 is composed of a lining
30 layer 11 and a doubler layer 12 which are united by a layer of cement which exists in thick stripes 15 and thin intermediate portions 16. This, as I disclosed in my above mentioned patent, is best applied by means of a notched doctor blade
35 which spreads the cement and forms the ridges 15 as the fabric 11 is drawn under the blade. In the areas 16, the cement is exceedingly thin and may even exist as a discontinuous film which exhibits high adhesive properties almost
40 instantaneously. Consequently, the doubler 12 may be immediately applied against the wet cement and be permanently stuck with no danger of slipping. The drawing shows a single napped
45 doubler. In this case, the fabric side 13 is always laid against the cement, while the napping 14 forms the outer surface, but a double napped doubler is frequently desirable and often used.

The cement may be compounded as by the addition of substantial quantities of glue or casein
50 to have material stiffness in the thick stripes 15 and, therefore, when the lining is bent in a direction along the stripes, it will be found that it possesses material stiffness and will "arch" and stand up well. The cement in the areas 16, how-
55

ever, is so thin that it introduces almost no resistance to bending and, so, when such a lining is incorporated in a shoe with the cementing direction running across the toe, it will be found that the shoe possesses an extraordinary degree of flexibility. The residual cement in the areas 16 possesses enough adhesiveness to prevent piping or wrinkling during wear, but it is the thick mass of cement in the stripes 15 upon which I depend to produce, when finally dried or vulcanized, a very strong, wear resistant, adhesive bond.

By setting the doctor blade close so that the surface of the fabric is rubbed or scraped in the areas 16, the film which remains is broken up into such a discontinuous system that air may pass through the sheet very readily. As an example of this, tests made on material as previously manufactured show that the breathability of an over-all cemented material is 204 seconds, while that made according to my present invention is less than one second. Breathability is measured by the number of seconds required for 100 cubic centimeters of air to pass through one square inch of fabric under a uniform pressure. The tests were made on a standard densometer. This enormous increase contributes greatly to the comfort of the wearer of the shoe and, also, permits economies to be made in manufacture, since, to obtain high breathability, it is no longer necessary to cut out the lining and the doubler separately.

My invention is by no means limited to the lining of shoes, but finds use wherever light materials need plumping or reinforcement, as in pocket books, etc. Nor, is it necessary that the lining element 11 always be a textile. Light leather may be coated with cement in the manner which I describe and plumped or doubled by the application of a napped doubler immediately following, and, although I consider that the method which I have described offers the simplest means for achieving my purpose and produces a better product, since the residual adhesive in the areas 16 prevents any scuffing or piping in use, it is not necessary that the cement be applied either to the lining or doubler as a continuous film, but it may be applied in a series of stripes 15 to leave the areas 16 entirely free of cement.

It will be seen that I have produced a "combination" or laminated lining which may be cemented in the piece expeditiously and inexpensively in the textile mill; which avoids the expense of separate cutting-out and assembly; which, although holding the lining elements together by a durable, strong bond, is yet free from the uncomfortable, "rubber-boot" sensation heretofore always associated with laminated linings; and, which, in addition, possesses sufficient

transverse stiffness to maintain the neat, well-lasted appearance of the shoe.

I claim:—

1. Laminated material comprising two textile fabrics united by an adhesive layer applied to one of said fabrics in a series of lines of thick and thin portions, forming a repeated pattern, the film of adhesive in the thin portions being discontinuous and being of such area relative to the area covered by the thick portions that the composite laminated material is rendered highly pervious.

2. Laminated material comprising two textile fabrics united by an adhesive layer applied to one of said fabrics in a series of alternately thick and thin striations, the film of adhesive in the thin striations being discontinuous and being of such area relative to the area covered by the thick striations that the composite laminated material is rendered highly pervious.

3. Laminated material comprising two textile fabrics united by an adhesive layer applied to one of said fabrics in a series of alternately thick and thin striations, whereby to impart substantial stiffness when the material is flexed along the striations and great flexibility when flexed across the striations, the film of adhesive in the thin striations being discontinuous and being of such area relative to the area covered by the thick striations that the composite laminated material is rendered highly pervious.

4. Laminated material comprising a lining layer of textile fabric, a doubler layer of napped textile fabric and an intermediate adhesive layer having a series of striations of unequal thickness in its surface so distributed in regard to thickness that the thick portions impart substantial binding and transverse stiffness, the remaining portions being discontinuous and so thin and pervious and of such area relative to the area covered by the thickened portions as to secure a breathability of the laminated material corresponding to that of about ten seconds as determined on a standard densometer.

5. Laminated material comprising a lining layer of textile fabric, a doubler layer of napped textile fabric and an intermediate adhesive layer having a series of striations of unequal thickness in its surface so distributed in regard to thickness that the thick portions impart substantial binding and transverse stiffness, the remaining portions being discontinuous and so thin and pervious and of such area relative to the area covered by the thickened portions as to secure a breathability of the laminated material corresponding to that of about one second as determined on a standard densometer.

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