

April 28, 1936.

J. CAVANAGH

2,038,644

SHOE AND THE MANUFACTURE THEREOF

Filed Sept. 12, 1934

2 Sheets-Sheet 1

Fig. 1.

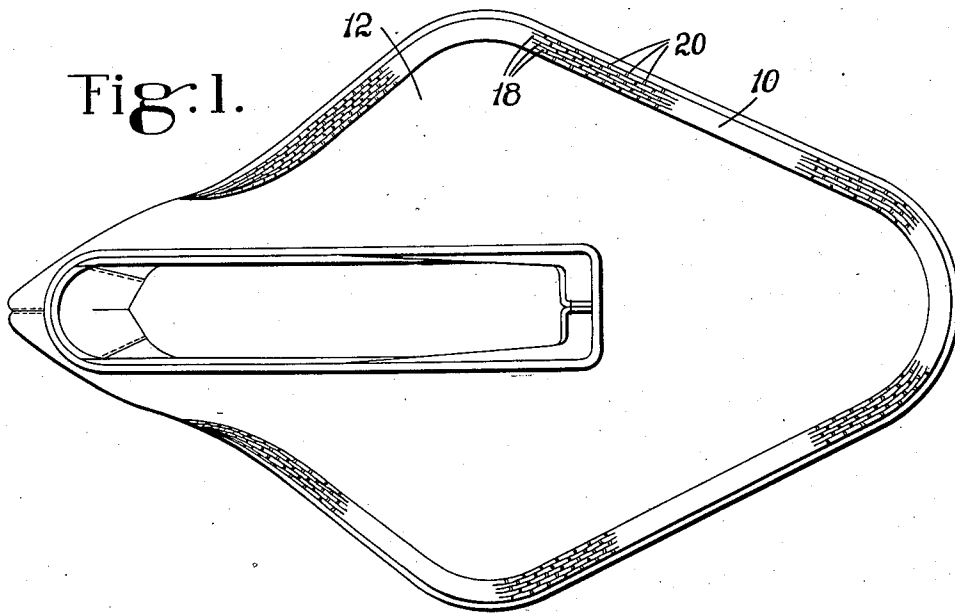


Fig. 2.

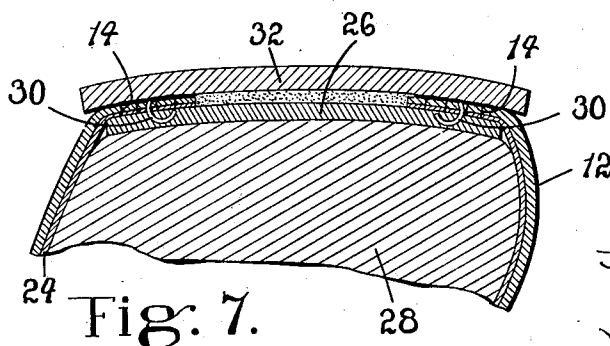
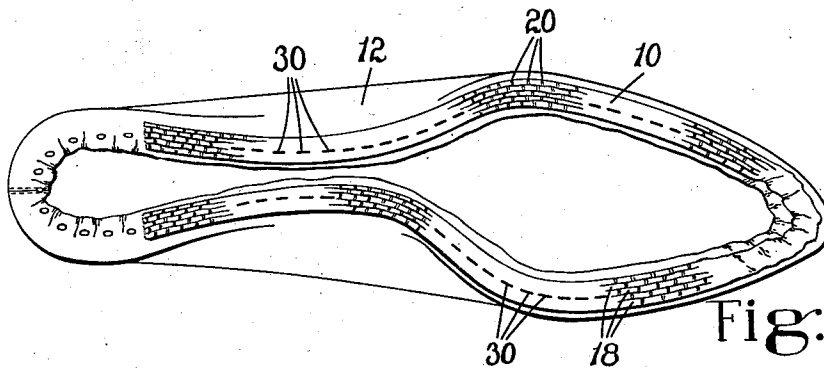


Fig. 7.

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2 Sheets-Sheet 2

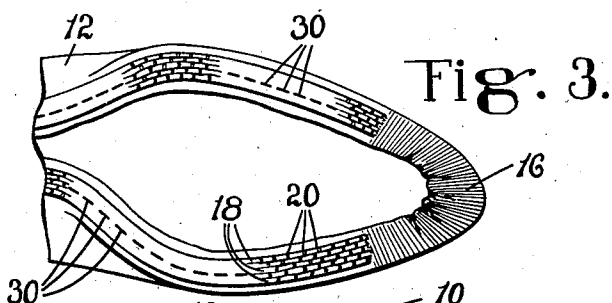
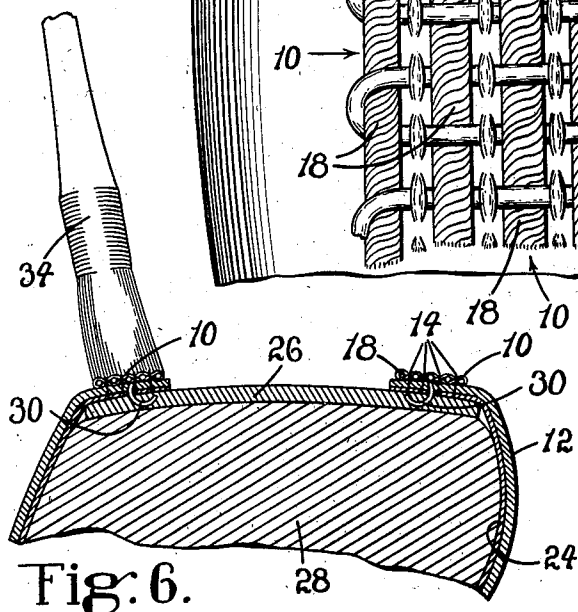
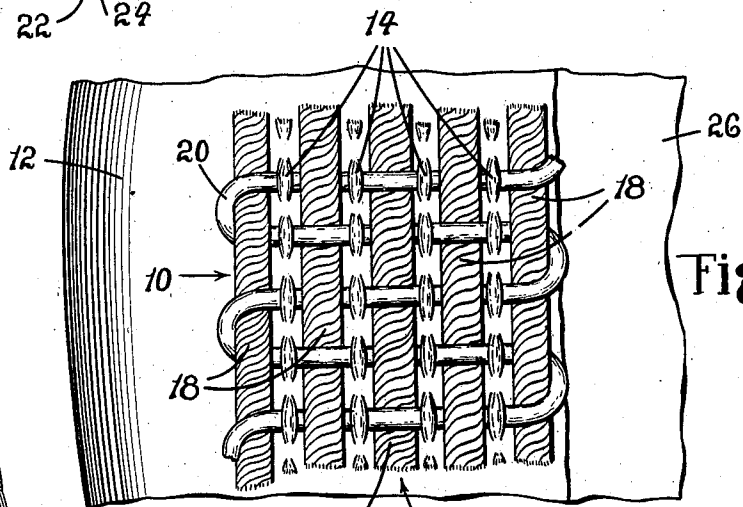
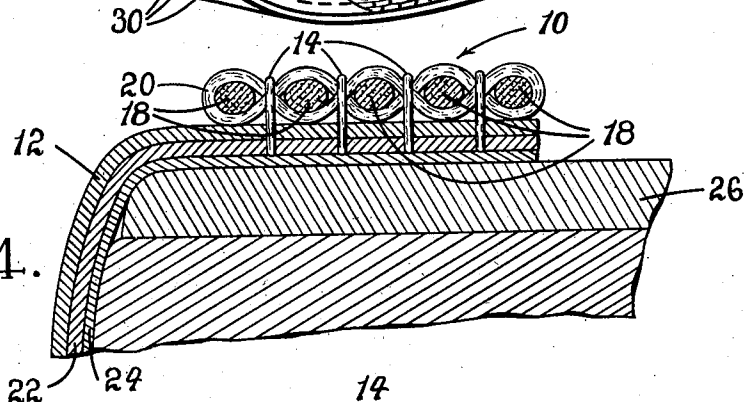


Fig. 4.



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UNITED STATES PATENT OFFICE

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SHOE AND THE MANUFACTURE THEREOF

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Application September 12, 1934, Serial No. 743,664

16 Claims. (Cl. 12-142)

This invention relates to improvements in shoes and the manufacture thereof and is illustrated herein with reference to the manufacture of compo shoes.

In the manufacture of compo shoes, it is customary to prepare the overlasted marginal portion of a leather shoe upper for the reception of the sole-attaching cement by roughening or scouring the upper, thereby removing the surface layer of the leather which is usually of such a character and is so finished as to interfere with the obtaining of a reliable cement bond between the outsole and the upper. In my copending application Serial No. 601,372, filed March 26, 1932, there is disclosed an improved method of making compo shoes in accordance with which the outsole, instead of being attached by cement directly to the overlasted margin of the upper, is cement-attached to a strip of tape or other fabric which has preliminarily been stitched to the outer surface of the marginal portion of the upper, the tape being of such a character as to provide a secure anchorage for the sole-attaching cement.

One object of the present invention is to provide still further improvements in the manufacture of compo shoes thereby to eliminate both the roughening of the overlasted margins of the uppers and the application of the outsole-attaching cement in liquid form.

With this object in view, the invention provides an improved method of making shoes having cement-attached soles which, in one aspect, contemplates employing as a source of the sole-attaching cement a strip of fabric tape or the like having strands of fibrous material, such as fibrous cellulose derivative, of such a nature that it is readily capable of being converted into cement by the action thereon of a selected solvent, for example acetone, and having other strands of a more inert material which is insoluble in the selected solvent. In the practice of this improved method, the tape is secured to the margin of the upper by means of fastenings, for example, stitches, composed of material that is insoluble in the selected solvent, which engage the insoluble strands of the tape. As herein exemplified, a woven tape is employed, the warp threads of which are composed of cellulose ester fibers, such as cellulose acetate fibers, while the weft or filler threads comprise fibers of a more inert material, such as cotton or linen, and the stitches which secure the tape to the upper are inserted before the upper is assembled with an insole on a last and are arranged in a plurality

of rows located between or substantially parallel to the warp threads and extending approximately parallel to the edge of the upper, the individual stitches encircling the filler threads and anchoring them securely to the upper. With such a construction when, after lasting, the tape is treated with a quantity of the selected solvent to form the sole-attaching cement, the cotton filler or weft of the tape, together with the stitching with which the tape is attached to the upper, forms a coherent network which is embedded in the cement and which serves while the cement is soft to control the flowing or spreading of the cement under the sole-attaching pressure. At the same time, this network is secured to the upper by the stitching or other fastenings so that when the cement becomes set or hardened it is firmly united with the upper even though the upper has not been roughened in the usual way to prepare it for the reception of the cement. Moreover, by employing tape such as herein described as a source of sole-attaching cement, it becomes unnecessary to apply cement in liquid form to the upper or to the sole and thus cleanliness at this stage of the shoemaking operations is greatly facilitated.

It is to be recognized that invention resides also in a shoe upper having secured to its marginal portion and extending parallel to its edge a strip of fabric such as tape, at least some of the threads or strands of which are composed of a readily soluble cellulose derivative.

Considered in another aspect, the invention consists in a shoe comprising an upper, an outsole, a layer of cement interposed between the outsole and the marginal portion of the upper, and a coherent network of material, preferably of a fibrous nature, embedded in the cement and secured to the upper.

The invention will now be described with reference to the accompanying drawings, in which

Fig. 1 is a plan view of the assembled upper materials of a shoe as they appear before being applied to a last, the view showing a fabric tape having warp threads of cellulose derivative secured by stitching to the lower margin at the outer side of the upper;

Fig. 2 is a bottom plan view of the upper after it has been lasted over an insole on a last;

Fig. 3 is a view similar to Fig. 2, but illustrating the omission of the tape around the toe of the shoe;

Fig. 4 is a fragmentary cross-sectional view on an enlarged scale through the overlasted margin of the upper indicating more or less conven-

tionally the tape and the stitching which secures the tape to the upper;

Fig. 5 is a plan view of the parts shown in Fig. 4;

Fig. 6 is a perspective view, illustrating the operation of applying solvent to the tape; and

Fig. 7 is a cross-sectional view taken through the forepart of a shoe on a last after the outsole has been laid and secured to the upper.

In making shoes in accordance with the present invention, the uppers are prepared in the usual way, the patterns used in cutting uppers having been accurately drafted to insure that no great amount of material will have to be trimmed from the lasting allowance after the lasting operation. Thereafter, the tape which is to be acted upon by a solvent to produce the outsole-attaching cement is applied to the outer surface of the marginal portion of the upper and securely fastened thereto.

As illustrated in Fig. 1, a strip of woven tape 10 is secured flat against the outer marginal surface of the upper 12 by fastening devices such as rows of stitching 14 (Figs. 4 and 5) extending substantially parallel to the edge of the upper, the tape 10 extending from the vicinity of the heel breast line at one side of the upper forwardly around the toe and then rearwardly approximately to the heel breast line at the opposite side of the upper. In order to avoid such puckering or pleating of the tape at the toe of the upper as might take place during the pulling over and lasting of the upper at the toe of the shoe, the tape 10, if desired, may be applied to the upper so that it will extend forwardly only approximately as far as the tip line of the upper, as illustrated in Fig. 3, thus leaving the margin of the upper at the toe of the shoe to be roughened in a customary manner, as indicated at 16, and attached to the outsole by means of pyroxylin cement applied in the usual way.

The illustrated tape 10 consists of longitudinally extending warp threads 18 and transversely-disposed weft or filler threads 20, the warp threads 18 being composed of fibrous material, for example cellulose esters, such as cellulose acetate or cellulose nitrate, or cellulose ethers, such as ethyl cellulose or benzyl cellulose, which are readily soluble in organic solvents, for example, acetone, to form cement while the weft threads are composed of fibers of relatively insoluble material, such as cotton or linen. The several rows of stitches 14, which are also composed of relatively insoluble fibrous material, are shown extending between the warp threads 18, as more or less conventionally shown in Figs. 4 and 5, the individual stitches encircling the weft threads 20 and extending through the upper 12, thereby securely anchoring the tape to the upper. In practice, however, it is not essential that the stitches 20 be located between the warp threads but only that the lines of stitching extend in directions substantially parallel to the warp threads so that the stitches together with the weft threads will form a coherent network for controlling the spread of the cement produced by the action of the solvent upon the warp threads. If a doubler is used, as indicated at 22 in Fig. 4, the stitches 14 would naturally extend through the doubler as well as through the upper. Whether the stitches 14 extend through the lining 24 is a matter of choice. Moreover, the tape 10 need not necessarily be woven inasmuch as it may be braided or otherwise fabricated so as to comprise threads which extend more or less

transversely of the tape and which include both threads that are readily soluble and threads which are relatively insoluble in organic solvents.

After the tape has been stitched to the upper as above described, the upper and an insole 26 are assembled upon a last 28 and the shoe is pulled over and lasted in any usual or suitable manner. As illustrated, the upper is secured in overlapped relation at the sides of the shoe by means of fastenings, such as staples 30, as shown in Figs. 3, 6 and 7, which may be anchored in the substance of the insole 26 without extending through to the inner surface of the insole. The shoe may advantageously be side lasted in this fashion by the employment, for example, of the staple side lasting machine shown in United States Letters Patent No. 1,815,297, granted July 21, 1931, upon an application filed in the name of George Doddu. The toe portion of the shoe may conveniently be cement lasted, for example, in a bed lasting machine with the aid of the toe plate or binder disclosed in an application for Letters Patent of the United States Serial No. 362,753, filed May 3, 1929, in the name of Joseph Fausse. The heel end of the upper, as illustrated, is secured in lasted relation by means of tacks. It should be understood, however, that the lasting may be done in other ways, either by hand or with the aid of other machines, as desired. The upper having been lasted, any surplus material is trimmed from the margin of the upper both at the sides and at the toe by the usual upper trimming operations. Thereafter, the bottom filler and the shank piece are applied in the usual way.

In preparing the outsole, its margin may be reduced in thickness in its shank portion only or around its forepart also, as may be desired, and the entire marginal portion of the sole at its attaching side roughened, for example, by means of a rotating wire brush, to insure the formation of a satisfactory bond between the material of the sole and the attaching cement.

To prepare the bottom of the shoe for the reception of the outsole 32, in cases where the tape 10 extends around the toe of the shoe as illustrated in Figs. 1 and 2, it is only necessary to apply a solvent, such as acetone, by means, for example, of a brush, as illustrated at 34 in Fig. 6, so as to soften the cellulose acetate warp threads of the tape, thereby converting them into cement. The shoe and the outsole are then brought together in proper relative positions and placed under pressure, this operation being performed, for example, in a cement sole attaching machine of the type disclosed in United States Letters Patent No. 1,897,105, granted February 14, 1933, upon an application of Milton H. Ballard. The pressure supplied by a sole attaching machine of this type causes the cement derived from the tape 10 to fill the meshes of the network comprising the cotton or linen weft or other transversely extending threads 20 and the stitching 14. During this period, the weft or other relatively insoluble, transversely extending threads and the attaching stitches constitute a coherent network, more or less resembling cheesecloth, which functions to control the flowing or spreading of the cement and effectively to prevent objectionable squeeze-out of the cement over the edge of the insole and upon the exposed outer surface of the upper of the shoe. The shoe is maintained under pressure in the sole attaching machine until the cement has become set or hardened. After the cement has hardened and the shoe has been removed

from the press, the cement will have penetrated the material of the outsole and become firmly bonded thereto. Moreover, the cement will be also firmly secured or anchored to the shoe upper by means of the stitches 14, the latter engaging the relatively insoluble transverse threads which are firmly embedded in the hardened cement. It will therefore be seen that by employing the tape 10 and stitching it to the upper, as herein described, the usual roughening of the upper material is rendered unnecessary in order to insure a satisfactory bonding of the cement to the upper. Thus, not only is a usual operation eliminated but the danger of weakening the upper and other disadvantages of the roughening operation are avoided. Furthermore, cleanliness in the manufacture of the shoe is facilitated inasmuch as no direct application of liquid cement to the overlapped upper is required.

If the tape 10 is omitted around the toe, as illustrated in Fig. 3, the toe portion of the upper margin may be roughened as usual after which it may be coated with liquid pyroxylin cement and allowed to dry and likewise the liquid cement will also be applied to the toe portion of the roughened margin of the outsole and allowed to dry. Thereafter, the dry cement at the toe portions of the upper and the outsole will be activated by the application of a solvent thereto.

Having described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. That improvement in methods of making shoes having cement-attached soles which comprises applying to the margin of a shoe upper a strip of textile fabric having threads extending in one direction and comprising fibers capable of being converted into cement by the action of a selected solvent thereon and having also threads which extend in another direction and are not soluble in said solvent and securing said relatively non-soluble threads to the margin of the upper, lasting the upper, applying a quantity of the selected solvent to said strip, and shortly thereafter applying a sole to the shoe bottom and maintaining the sole and the shoe under pressure until the cement formed by the action of the solvent has set sufficiently to secure the sole to the shoe.

2. That improvement in methods of making shoes having cement-attached soles which comprises applying to the margin of a shoe upper a strip of woven tape having warp threads comprising fibers convertible into cement by the action of a selected solvent thereon and filler threads comprising fibers which are not soluble in said solvent and securing said strip of tape to the upper by fastenings engaging said filler threads, lasting the upper, applying a quantity of the selected solvent to said strip, and shortly thereafter applying a sole to the shoe bottom and maintaining the shoe and sole under pressure until the cement formed by the action of the solvent upon the warp threads of the strip of tape has set sufficiently to secure the sole to the shoe.

3. That improvement in methods of making shoes having cement-attached soles which comprises applying to the margin of a shoe upper a strip of woven tape having warp threads capable of producing cement when acted upon by an organic solvent and filler threads which are insoluble in said solvent, securing said strip of tape to the margin of the upper by a plurality of rows of stitches extending in the direction of said warp threads and encircling said filler threads,

said stitches being insoluble in said solvent, lasting the upper, applying said solvent to said tape, and thereafter applying a sole to the shoe bottom and maintaining the shoe and sole under pressure until the cement formed by the action of the solvent upon the warp threads of the tape has set sufficiently to attach the sole to the shoe.

4. That improvement in methods of making shoes having cement-attached soles which comprises applying to the margin of a shoe upper a strip of textile fabric having threads composed of cellulose ester fibers and transversely extending threads composed of fibers of a material more inert than esters of cellulose, stitching said strip of tape to the margin of the upper by means of stitches encircling said transversely extending threads, lasting the upper, applying to said tape a solvent for said cellulose ester threads, and thereafter applying a sole to the shoe bottom and maintaining the shoe and sole under pressure until the cement formed by the action of the solvent upon said cellulose ester threads has set sufficiently to secure the sole to the shoe.

5. That improvement in methods of making shoes having cement-attached outsoles which comprises applying to the margin of a shoe upper a strip of woven tape having cellulose ester warp threads and cotton filler threads, securing said cotton filler threads to the upper by rows of stitches extending substantially parallel to said warp threads, lasting the upper and securing its overlapped margin to an insole, softening the warp threads of said tape with acetone, and shortly thereafter applying an outsole to the shoe bottom and maintaining the shoe and outsole under pressure until the cement formed by the action of the solvent upon the warp threads of the tape has set sufficiently to secure the outsole to the shoe.

6. That improvement in attaching the marginal portions of shoe parts which comprises applying to the marginal portion of one shoe part a strip of textile fabric having threads comprising fibers convertible into cement by the action thereon of a selected solvent and having transversely extending threads comprising fibers insoluble in said solvent, securing said transversely extending threads to said shoe part by means of fastenings insoluble in said solvent, applying a quantity of the selected solvent to said strip of fabric, and shortly thereafter pressing said parts together and maintaining the pressure until the cement formed by the action of the solvent on the longitudinal strands of the fabric has set sufficiently to hold said parts together.

7. That improvement in methods of manufacturing shoes which comprises applying progressively along the marginal portion of a shoe upper from approximately the heel breast line at one side around the toe to approximately the heel breast line on the opposite side of the upper a strip of textile fabric comprising threads which are readily soluble in a selected solvent to form cement and transversely extending threads which are relatively insoluble in said solvent and securing said strip to the upper by a plurality of approximately parallel rows of stitching extending lengthwise of said strip and engaging said relatively insoluble threads, assembling the upper and an insole upon a last, lasting the shoe and securing the overlapped margin of the upper together with said strip to the insole, applying said solvent to said strip, applying an outsole to the shoe bottom, and maintaining the shoe

and the outsole under pressure until the cement formed by the action of the solvent upon said soluble threads has set sufficiently to secure the sole to the shoe bottom.

5 8. That improvement in methods of manufacturing shoes which comprises applying to each marginal portion of a shoe upper from approximately the heel breast line to approximately the tip line a strip of textile fabric comprising
10 threads which are readily soluble in a selected solvent to form cement and transversely extending threads which are relatively insoluble in said solvent and securing said strip to the upper by a plurality of rows of stitching extending approximately parallel to the edge of the upper
15 and engaging said relatively insoluble threads, assembling the upper with an insole on a last, lasting the shoe, securing the overlapped margin of the upper together with said
20 strips to the insole, applying said solvent to said strips, and shortly thereafter applying a sole to the shoe bottom and maintaining the shoe and sole under pressure until the cement formed by the action of the solvent upon said soluble
25 threads has set sufficiently to secure the sole to the shoe.

9. That improvement in methods of making shoes having cement-attached outsoles which consists in applying to the margin of a shoe upper
30 per a woven tape having cellulose acetate warp threads and cotton weft threads and securing said tape to the upper by cotton stitches encircling said weft threads, lasting the upper, applying to said tape a solvent for said warp
35 threads thereby softening the latter to form cement, and applying a sole to the shoe bottom and maintaining the sole and the shoe under pressure until said cement has set sufficiently to secure the sole to the shoe.

40 10. A shoe upper having a strip of textile fabric extending peripherally of and lying flat against the marginal portion of the upper, said strip having threads comprising cellulose derivative fibers adapted to be converted into cement
45 by the application thereto of a selected solvent and having transversely extending threads comprising fibers of a material relatively insoluble in said solvent, and stitches securing said transversely extending threads to the upper.

50 11. A shoe upper having a strip of woven fabric

extending peripherally of and lying flat against the marginal portion of the upper, said strip comprising warp threads composed of cellulose ester fibers and cotton filler threads, and a plurality of rows of stitching of thread composed of relatively insoluble material extending substantially parallel to the edge of the upper and securing said cotton filler threads to the upper.

12. A shoe upper having a strip of fabric stitched flat against and extending peripherally of its marginal portion, said fabric containing relatively soluble cellulose derivative fibers.

13. A shoe upper having a strip of textile fabric secured flat against and extending peripherally of the marginal portion of the upper, some of the threads constituting said strip being composed of a relatively soluble material, and said strip being secured to the upper by means of stitches extending substantially parallel to the edge of the upper and engaging transversely extending threads of the strip.

14. A shoe comprising an outsole, an upper having its marginal portion secured to the outsole by means of cement, and a coherent network of strands of fibrous material embedded in the cement and including a plurality of rows of stitches extending substantially parallel to the edge of the upper and anchoring the remainder of said network to the upper.

15. A shoe comprising an insole, an outsole, an upper having its marginal portion secured in overlapped relation to the insole, a layer of cement interposed between the margin of the upper and the outsole, and a multiplicity of strands of fibrous material embedded in said layer of cement and anchored to the upper by means of fastening devices.

16. A shoe comprising an insole, an outsole, an upper having its marginal portion secured in overlapped relation to the insole, a layer of cement interposed between the margin of the upper and the outsole, a multiplicity of threads embedded in said layer of cement and extending transversely of the margin of the outsole, and a plurality of rows of stitches extending substantially parallel to the edge of the upper uniting said threads with the upper.

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