Aug. 21, 1928. 1,681,327

H. M. EATON

BOOT AND SHOE STIFFENER

Filed March 18, 1924

Fig. 1

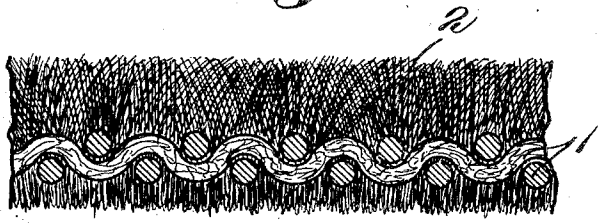


Fig. 2

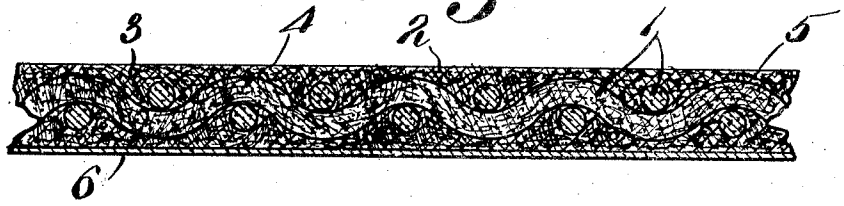
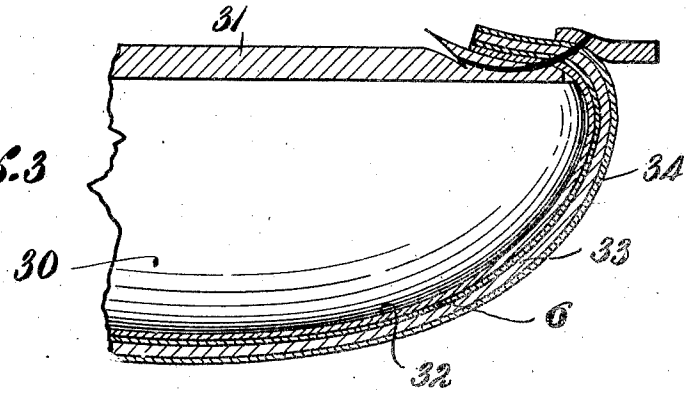


Fig. 3



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UNITED STATES PATENT OFFICE.

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BOOT AND SHOE STIFFENER.

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In the manufacture of box toes and other stiffeners for foots and shoes such as counters and insoles, it is customary to roll on a fabric or felt base a thick stiffening mixture and to mold the resulting product into the desired shape. This procedure results in a product in which the stiffening mixture is largely confined to the surface of the base and for this reason the product leaves much to be desired.

According to the present invention the stiffening composition is deposited in and not on the base. Instead of partially filling the interstices of the base they are filled to excess and the excess scraped off. The base has the unique capacity of rapidly taking up large quantities of the composition even when the composition contains particles of solid material. The composition is characterized by thorough penetration and the ability to hold in the interstices until dry instead of flowing out after impregnation and before drying.

The base material may be a felt or a loose fibrous sheet, but preferably a woven fabric is used, such as burlap for heavy stiffeners and thin sheeting for light stiffeners. Anchored to one or both sides of the base are masses of fibers such as jute fibers. The fibers are preferably sufficiently stiff not to mat closely together upon normal handling or storage. If a felt or loose fibrous material is employed, the fibers may comprise some of the fibers of the material itself, upended by picking or like operation. If fabric having few if any loose fibers is used, a mass of loose fibers may be anchored to the fabric by punching it through the fabric at recurrent intervals. In either case the mass of fibers should be of such character as to absorb or present a capillary attraction for the impregnating liquid.

The impregnating agent will be chosen of such characteristics as the properties and purposes of the ultimate boot or shoe shall require. For both waterproofing and stiffening of the base material, for example, solutions of cellulosic compounds may be employed, and in order to facilitate the impregnation, a comminuted absorptive substance such as powdered asbestos, plaster of Paris, etc. may be incorporated therewith to advantage. The treated sheet may be shaped immediately before drying, or it may be allowed to dry in sheet form, being subsequently softened with a suitable solvent, shaped into the finished article, and the article dried to its permanent condition.

In the accompanying drawings;

Fig. 1 is a cross section of the base before impregnation;

Fig. 2 is a cross-section of the stiffener material; and

Fig. 3 is a sectional view of one application of the stiffener in a lasting operation.

The base shown in Fig. 1 comprises a sheet of fabric consisting of the woven threads 1 and a mass of jute fibers 2, passing through and between the woven threads 1 and standing predominantly transversely of the surface of the woven sheet.

Fig. 2 shows the base after treatment with the impregnating agent wherein the comminuted absorptive substance 3, represented by stippling, is disseminated throughout and both the threads 1 and fibers 2 are embedded in a matrix of cellulosic material 4 represented by cross-hatching. The treated sheet is shown reduced in thickness, having a compacted upper surface 5 and a sheet of paper 6, preferably thin absorbent paper such as rough-finished kraft paper, adhering to its lower surface.

The base material may be impregnated in various ways, one suitable method consisting in dipping it into the impregnating mixture, then drawing it between scrapers spaced apart a predetermined distance, thereby to scrape off the excess mixture, then partially drying and compressing to the desired thickness and finally drying. The paper sheet 6 is preferably applied while the base is still wet so that it is bound in position by the tackiness of the mixture.

If it is desirable to increase the adhesive properties of the treated base material, or to prolong the period during which it shall remain tacky or gummy, this result may be readily effected by the addition of a polysaccharose, such as dextrine to the impregnating bath, without otherwise altering its essential characteristics and without entailing any change in the procedure to be followed.

This adhesive causes the paper (or other covering) to adhere more tightly to the base and in the event the material is to be stuck to another part it makes the union more permanent. The paper may be sufficiently thin and porous to permit the adhesive to

pass therethrough to such extent that the material will adhere to another part applied to the paper side thereof while wet.

The following are examples of ingredient proportions for particular uses:

Women's box-toes.

16 vols. liquid celluloid (20° Bé.).
4 vols. comminuted asbestos.
1 vol. dry dextrine.
12 vols. alcohol.

Men's box-toes.

20 vols. liquid celluloid (20° Bé.).
4 vols. comminuted asbestos.
4 vols. comminuted plaster of Paris.
1 vol. dry dextrine.
16 vols. alcohol.

But obviously this composition may and usually will be modified to correspond to the specific qualities of fabric employed and the properties desired in the finished product, as indicated above. Such modifications are included in the present invention and comprehended in the following claims.

It is to be noted that by the present invention the fibers provided may be of the same or of a different material from the fabric itself and accordingly they may be selected upon the basis of their capillarity with respect to the impregnating fluid. Since the fibers extend predominantly transversely of the sheet they afford longitudinal conduits from the outside to the innermost portions of the fabric and promote a most intimate and thorough saturation thereof by the liquid used, inducing uniform penetration and inhibiting the inclusion of air spaces therein. The addition of comminuted material to the impregnating liquid augments this action and restrains the liquid from flowing out after impregnation and before drying.

In the illustration of one application of the stiffener (Fig. 3) 30 is the shoe last, 31 the insole, 32 the shoe lining, 33 the box-toe with the paper covering 6 against the lining, and 34 the upper. The box-toe may be shaped before drying but it is ordinarily shaped later by rewetting the blank in alcohol. A characteristic of stiffeners according to this invention consists in that they soften almost instantly and dry out quickly upon the last, whereby less time is consumed in applying the stiffeners and the shoe may be removed from the last much sooner. The paper covering 32 restrains the adhesive content of the stiffener from reaching the last in sufficient quantity to cause the shoe to stick to the last but permits enough of the adhesive content to pass therethrough to cause the lining to adhere to the stiffener. By regulating the quantity and length of the fibers 2 and the weight of the fabric 1 the thickness of the resulting stiffener may be varied widely. By virtue of the loose and open character of the fibers the thickness may be further regulated by varying the spacing of the scrapers between which the sheet passes. The thickness and stiffness may also be altered by varying the proportions of cellullosic material and absorptive substance.

When using comminuted asbestos as the filling material the resulting product is somewhat smoother and tougher due presumably to the fibrous character of the asbestos.

The binding of the paper to the base may in some cases be supplemented to advantage by gumming the paper before it is applied, or by otherwise applying an adhesive in addition to that contained in the impregnated base. In any event the binding should be so complete and continuous that the paper will not separate around the edges of the stiffener even when the edges are skived as in the case of box-toes.

I claim:

1. A stiffener for boots and shoes comprising a fabric sheet having a mass of fibers anchored thereto, said mass being impregnated with celluloid containing comminuted plaster of Paris and compacted against the sheet.

2. A stiffener for boots and shoes comprising a sheet of fibrous material having fibers attached thereto with their opposite ends projecting from the sheet, the sheet and the fibers on both sides thereof being impregnated with a stiffening composition.

3. A stiffener for boots and shoes comprising a sheet of fibrous material having fibers attached thereto with their opposite ends projecting from the sheet, the fibers on both sides thereof being impregnated with a stiffening composition, and compacted against the sheet.

4. A stiffener for boots and shoes comprising a sheet of fibrous material having fibers attached thereto with their ends disposed at opposite sides of the sheet, the fibers being impregnated with cellulosic material containing comminuted absorptive particles and a saccharose and their ends compacted against the sheet.

5. A stiffener for boots and shoes comprising a sheet of fibrous material having fibers attached thereto with their ends disposed at opposite sides of the sheet, the fibers being impregnated with celluloid containing comminuted asbestos and their ends compacted against the sheet.

6. A stiffener for boots and shoes comprising a sheet of fibrous material having fibers attached thereto with their ends disposed at opposite sides of the sheet, the fibers being impregnated with celluloid containing comminuted asbestos and dextrine and their ends compacted against the sheet.

7. A stiffener for boots and shoes compris-

ing a sheet of fibrous material having fibers attached thereto with their ends disposed at opposite sides of the sheet, the fibers being impregnated with celluloid containing comminuted asbestos and plaster of Paris and their ends compacted against the sheet.

8. A stiffener for boots and shoes comprising a sheet of fibrous material having fibers attached thereto with their ends disposed at opposite sides of the sheet, the fibers being impregnated with celluloid containing comminuted asbestos, plaster of Paris and dextrine and their ends compacted against the sheet.

9. A stiffener for boots and shoes comprising a sheet having a mass of fibers anchored thereto, a thin membrane in contact therewith and a matrix, containing a cellulosic material and a finely comminuted substance, impregnating said fibers and adhering to said membrane.

10. A stiffener for boots and shoes comprising a sheet having a mass of fibers anchored thereto, a thin membrane in contact therewith, a matrix containing a cellulosic material, a finely comminuted substance and a saccharose, impregnating said fibers and adhering to said membrane.

11. A stiffener for boots and shoes comprising a sheet of fabric having a mass of fibers anchored thereto, a matrix containing a cellulosic material and a finely comminuted substance impregnating said fibers, and a thin membrane in contact with said fibers upon one face of the sheet, said membrane being partially permeable by the cellulosic material when it is treated with a suitable solvent.

Signed by me at Boston, Massachusetts, this 5th day of March, 1924.

HORACE M. EATON.