H. C. EGERTON.

SHANK STIFFENER.

APPLICATION FILED MAY 2, 1919.

1,327,091. Patented Jan. 6, 1920.

Fig. 1,

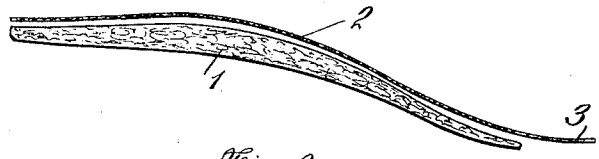


Fig. 2,

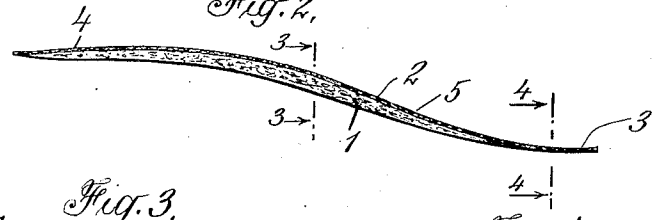


Fig. 3,

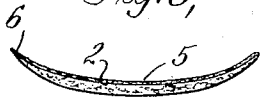


Fig. 4,

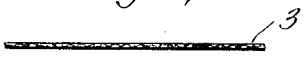


Fig. 5,

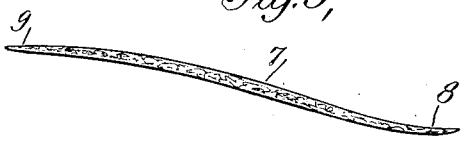
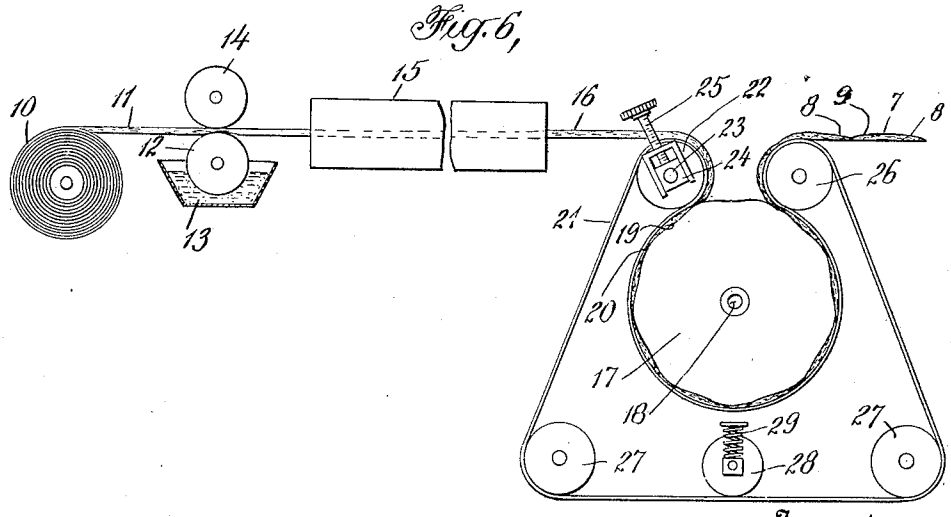


Fig. 6,



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SHANK-STIFFENER.

1,327,091. Specification of Letters Patent. Patented Jan. 6, 1920.

Application filed May 2, 1919. Serial No. 294,316.

To all whom it may concern:

Be it known that I, HENRY C. EGERTON, a citizen of the United States, and resident of Ridgewood, county of Bergen, State of New Jersey, have made a certain new and useful Invention Relating to Shank-Stiffeners, of which the following is a specification, taken in connection with the accompanying drawing, forming part of the same.

This invention relates especially to stiffening members for the shank and adjacent portions of shoes which may comprise fibrous material, such as cotton or other fiber in the form of cotton batting, cloth, paper, or the like with which is incorporated cured phenolic condensation cementing material so as to greatly stiffen and strengthen the article and make it possible to give a definite molded form thereto. By subjecting a sheet or piece of cotton batting, fabric or other fibrous material carrying and preferably impregnated with such phenolic condensation cementing material to moderate heat and high molding pressure the shaping and molding of the stiffening element may be effected and the edges may advantageously in some cases be more highly compressed, so that the incorporated cementing material is to a greater extent forced out of the edges toward the center of the stiffener so that the edges are left in relatively flexible penetrable condition and at the back of the shank stiffener, for example, the edge portions may be more readily nailed or secured to the other shoe elements. By originally using a greater amount of thickness of material in the edge or other portions of the article the pressure molding thereof may produce a substantially uniform thickness shank or sole stiffener in which the edge portions contain a relatively greater proportion of fibrous material and correspondingly less cementing material so as to be weaker and more flexible than the stiffer central portions. In these ways the center or any other desired portion of the stiffener may be rendered more stiff and rigid because containing a greater proportion of such phenolic condensation cementing material which may be present in the entire article to some such proportion as 30 to 60 per cent more or less when cotton batting or other cotton fiber material is used therewith.

In the accompanying drawings showing in a somewhat diagrammatic way various forms of such shoe stiffeners,

Figure 1 shows in longitudinal section the elements of such a shank stiffener before being molded.

Fig. 2 shows the complete molded and arched up shank stiffener.

Figs. 3 and 4 are transverse sections thereof taken substantially along the lines 3—3 and 4—4 of Fig. 2.

Fig. 5 is a longitudinal section through another form of shank stiffener; and

Fig. 6 is a diagrammatic view showing a method by which shank stiffeners of this general type may be preliminarily prepared or formed.

As shown in Figs. 1 and 2 the shank stiffener may in some cases be formed with an upper layer 2 of paper, cloth or other suitable material, such, for instance, as canvas, which has been coated or impregnated with such phenolic condensation cementing material as bakelite, condensite or Redmanol varnish compositions which may be quite thoroughly incorporated therewith and then the solvents used substantially removed by suitable drying treatment preferably before suitably shaped pieces of such impregnated fabric are severed from the strip or roll for use in such connection. The body 1 of such a stiffener may be of any suitable fibrous material and a mass of cotton batting which may be of somewhat tapered thickness at the various parts and preferably having its fibers arranged in a generally longitudinal direction with respect to the stiffener is suitable for many purposes after such more or less shaped fibrous material has been coated and preferably quite thoroughly impregnated with such dried phenolic condensation cementing material. In some cases also such a mass of cotton batting or other cemented or impregnated fibrous material may be used as the entire shank stiffener or as a sole stiffener when it may extend substantially throughout the shoe sole, although for some purposes an additional fabric layer such as 2 is desirable in connection therewith, since a more definite reduced thickness front portion may thus be secured which is sometimes desirable to somewhat stiffen and strengthen this part of the shoe.

These fibrous elements may be assembled in a suitably shaped mold and forced together under high pressure so that they are molded and compressed and simultaneously

subjected to the desired heat curing treatment of 15 to 30 minutes more or less at temperatures of 300° to 350° Fahrenheit or so, depending somewhat on the cementing material employed. In this way the phenolic condensation cementing material may be given such longitudinal and transverse curvature as is desired for the particular purpose. The central arched portion 5 of this shank stiffener may as indicated in Fig. 2 have considerably greater thickness and strength and rigidity than the forward and back edge portions 3, 4 and as shown in Fig. 3 this strong shank portion beneath the arch of the foot may in some cases be advantageously arched up transversely to any desired extent and formed with relatively thin lateral edges 6. The stiffener may in most cases be more or less flattened toward the front portion so that the forward edge portion 3 may sometimes be substantially flat as shown in Fig. 4.

Fig. 5 shows another form of shank stiffener in which a single layer of thick cloth, webbing or braid or a strip or piece of batting or wadding of cotton, flax or other suitable fiber or mixtures thereof, may be used after being impregnated or coated with such phenolic condensation cementing material and preferably somewhat profiled or tapered in thickness at various portions at any convenient part of the manufacturing operation, so that relatively thin and yieldable penetrable edge portions, such as 8, 9, may be formed in the shank or other stiffener while its central or arch support 7 is relatively thick and strong and rigid because in some cases containing relatively large proportions of the phenolic condensation cementing material, such as 50% or so by weight. Fig. 6 shows a mold in which such a shank stiffener or the blank therefor may be conveniently formed from a roll 10 of cotton batting, webbing or wicking 11 which may advantageously have relatively heavy open textured or loosely twisted longitudinal fibers. This web or strip of material which may be of such width as to make one or more strips or rows of such shank or shoe sole stiffeners may be coated or impregnated with any suitable phenolic condensation cementing material, such as bakelite or condensite varnish from the trough 13 in which the applying or impregnating roll or device 12 may be arranged so as to coat the material in a substantially thorough and complete manner in connection with a top presser roll 14, if desired. The coated or impregnated fibrous material may then be led through a suitable drying device or chamber 15 of any suitable length and construction so that the impregnated dried fibrous material 16 does not contain an objectionable amount of the varnish solvents and has been subjected to a sufficient heat drying or slight curing action so that the phenolic condensation cementing material is sufficiently fluent under heat to make possible such profiling as seems desirable in this connection. For some purposes it is advantageous to run the coated and dried fibrous material while still warm from the drying apparatus directly into the profiling and preliminary molding device which may comprise a profiled molding roll or member 17 having a series of high spots or portions 20 and corresponding depressions 19 adapted to form the thicker arch supporting portions of such shank members, for example. A coöperating flexible compression member, such as a roll or belt may cooperate with this molding member, and if desired, a preliminary compressing roll 23 may be adjustably mounted in connection with the molding roll or drum as by having adjusting screws 25 in connection with the trunnion blocks 24 of this compression roll so that it may be powerfully forced against the coöperating molding member and force the fibrous sheet 16 into the profiled surface of the molding member in connection, if desired, with a sheet steel or other suitable metallic belt 21 which may be interposed as indicated in Fig. 6. This metallic belt may pass over such rolls as the final roll 26 which may also in some cases act as a positive compression roll, if desired, and over such idlers as 27 and the tension roll 28 which may be provided with tensioning springs 29 to keep the belt up to the desired tension and thereby hold the fibrous material tightly against the profiled molding member or roll after its initial compression against the same. One or more of these coöperating compressing devices may also be heated by steam or otherwise to such temperature as to exert a considerable curing action on the phenolic condensation cementing material incorporated with such fibrous material or fabric, and for this purpose the molding roll 17 may have hollow trunnions 18 on which it is mounted which serve to admit steam or other heating fluid to the roll to maintain its surface at such temperatures as 320° to 350° Fahrenheit, more or less. In this way especially with a molding roll or member of considerable size, the impregnated fibrous material may be maintained in contact therewith for a number of minutes so as to effect partial curing and profiling of the fibrous material which emerges with successive thick portions 7 and thin front and back portions 8, 9 corresponding generally to Fig. 5, the transverse curvature or arched up shape being sometimes also imparted to some extent to the shank stiffener blank during this part of the process, if desired, at least to a considerable extent. These profiled fibrous blanks may then be cut or otherwise severed and subjected to a further

molding curing operation in suitable molds to complete the curing thereof and this may be done either at the factory where they are preliminarily formed or elsewhere where they may be given their final molded form to suit the particular style of shoes with which they are to be used, or in some cases to suit the particular shape necessary to properly fit the wearer's foot. The pressures obtainable with such a belt compression device need only be sufficient to hold the compressed fibrous material in such profiled compressed condition as is effected by the preliminary compressing roll or member and the moderate or partial curing of the cementing material insures sufficient cohesion so that a coherent somewhat shaped shank stiffener blank may thus be conveniently formed which when severed from the strip or web of material may advantageously be further or completely cured under considerably higher pressure which may also be relied upon to give the desired smooth or other surface finish to the shank stiffener. It is usually desirable also to use somewhat higher curing heats for this second curing operation which seems advantageous in effecting such reshaping of the partly cured impregnated fibrous material as is advantageously used for such articles.

This invention has been described in connection with a number of illustrative embodiments, forms, proportions, materials, arrangements and methods of preparation, curing, molding and use, to the details of which disclosure the invention is not of course to be limited, since what is claimed as new and what is desired to be secured by Letters Patent is set forth in the appended claims.

I claim:

1. The shank stiffener having longitudinally and transversely curved surfaces and comprising a single layer of cotton batting material carrying about 40 to 50 per cent. of incorporated cured phenolic condensation cementing material, the rear edge portions of said stiffener being relatively thin and containing less cementing material to render them more yieldable or readily penetrable by attaching devices.

2. The shank stiffener having longitudinally curved surfaces and comprising a single layer of cotton batting material carrying incorporated cured phenolic condensation cementing material, the rear edge portions of said stiffener being relatively thin and readily penetrable by attaching devices.

3. The shank stiffener having a longitudinally curved upper surface and comprising a body of unwoven cotton fiber material thoroughly impregnated with cured phenolic condensation cementing and stiffening material and having a relatively thick and stiff central portion containing a larger proportion of such cementing and stiffening material.

4. The shank stiffener having an arched upper surface and comprising a body of fibrous material impregnated with cured phenolic condensation cementing and stiffening material and having a relatively stiff portion containing a larger proportion of such cementing and stiffening material.

5. The shank stiffener comprising a body of cotton fiber material carrying somewhat cured phenolic condensation cementing and stiffening material and having a larger proportion of such cementing and stiffening material.

6. The shank stiffener comprising fibrous material carrying somewhat cured phenolic condensation cementing and stiffening material.

7. The shoe sole stiffener having an arched upper surface and comprising a single layer of unwoven fibrous material containing cotton carrying about 30 to 60 per cent. of incorporated cured phenolic condensation cementing material, an edge portion of said stiffener being relatively thin and containing less cementing material to render the same more yieldable or readily penetrable by attaching devices.

8. The shoe sole stiffener having an arched upper surface and comprising a single layer of unwoven fibrous material containing cotton carrying incorporated cured phenolic condensation cementing material, a portion of said stiffener being relatively thin and containing less cementing material to render the same more yieldable or readily penetrable.

HENRY C. EGERTON.