Oct. 17, 1944. G. A. MINER 2,360,506

MANUFACTURE OF SHOES

Filed March 8, 1943 2 Sheets-Sheet 1

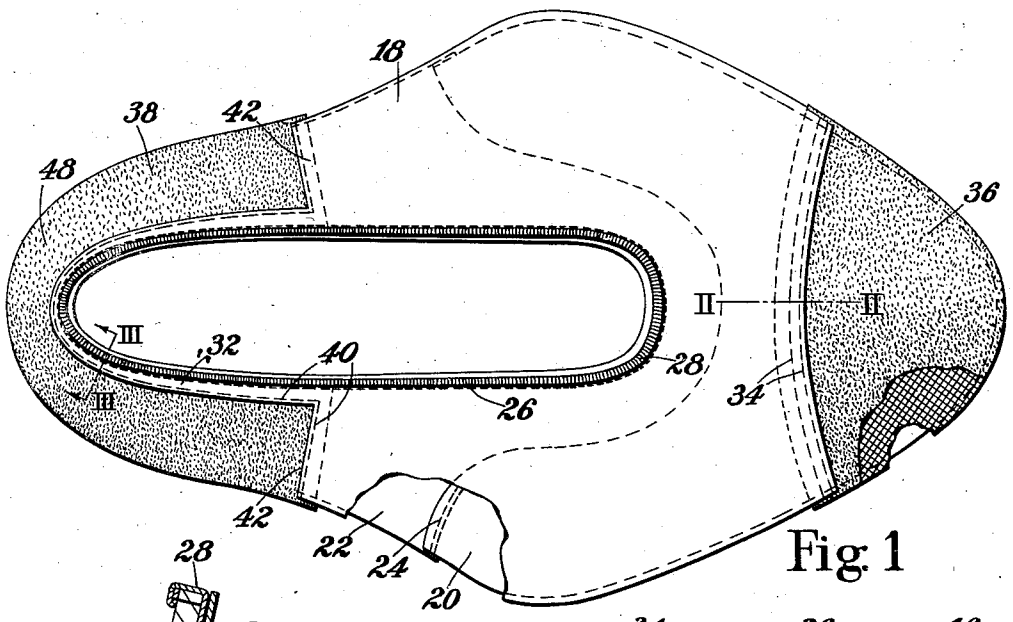


Fig. 1

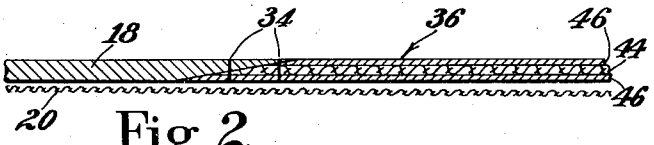


Fig. 2

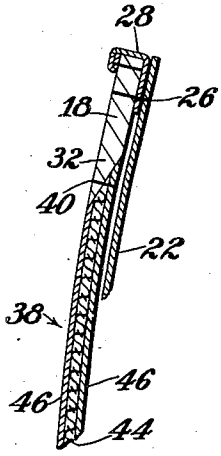


Fig. 3

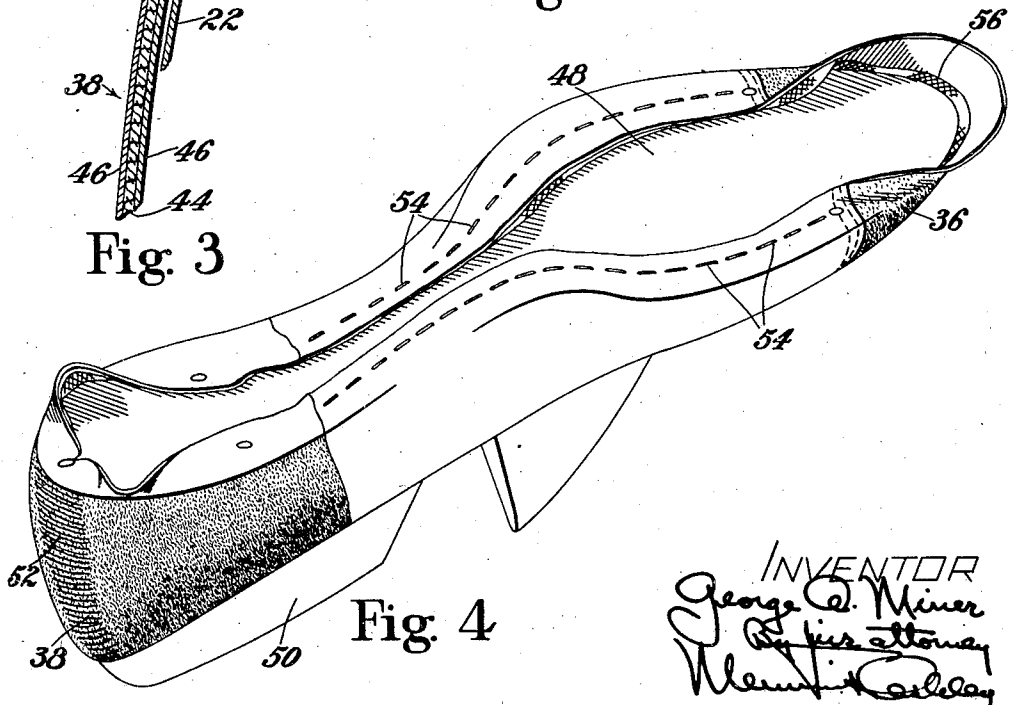


Fig. 4

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Oct. 17, 1944. G. A. MINER 2,360,506

MANUFACTURE OF SHOES

Filed March 8, 1943 2 Sheets-Sheet 2

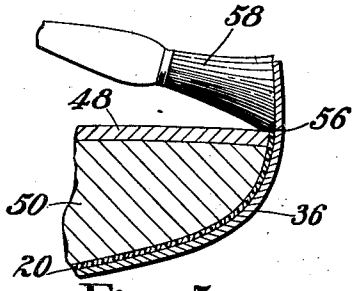


Fig. 5

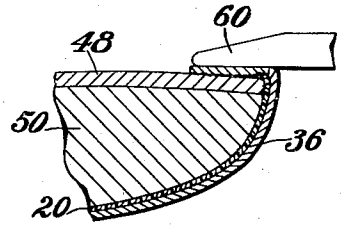


Fig. 6

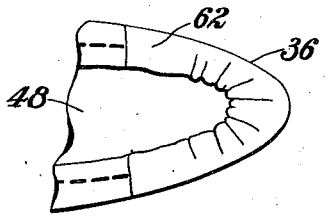


Fig. 7

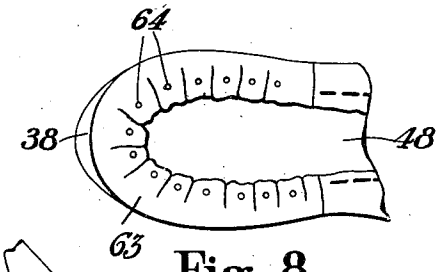


Fig. 8

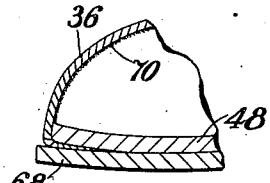


Fig. 12

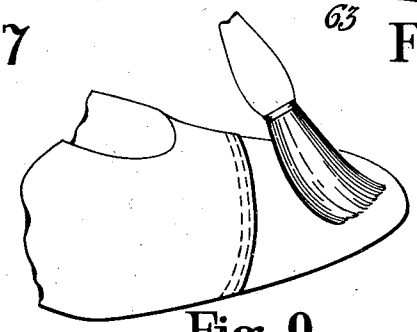


Fig. 9

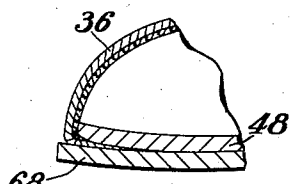


Fig. 11

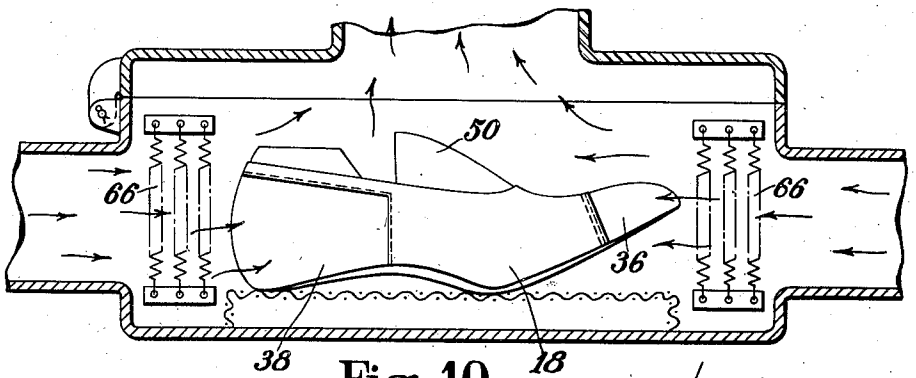


Fig. 10

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Patented Oct. 17, 1944 2,360,506

UNITED STATES PATENT OFFICE

2,360,506

MANUFACTURE OF SHOES

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Application March 8, 1943, Serial No. 478,343

14 Claims. (Cl. 12—142)

This invention relates to the manufacture of shoes and is particularly concerned with the problem of providing the strength, stiffness and last conforming characteristics usually desired in the toe and/or heel portions of the uppers of shoes.

It is a customary practice to reinforce the toe and heel portions of shoe uppers, as for example by the employment of toe stiffeners and counter stiffeners. Usually these stiffeners are interposed between the outer layer and the lining of the upper and because of the cost of the materials employed and the time and labor involved in making and applying the stiffeners their use adds substantially to the expense of making the shoes.

One object of the present invention is to reduce shoe manufacturing costs and avoid many of the difficulties involved in lasting and otherwise operating upon the toe and/or heel portions of shoes.

With this object in view, as herein illustrated, an upper is provided consisting of an outer layer of leather or other suitable upper material and an inner layer or lining, the lining being cut to extend throughout the full length of the shoe but the outer layer of the upper being cut without any toe portion and without any counter or heel part (except for a narrow upper edge portion which is to extend around the heel end of the shoe). There is also provided a toe piece for attachment to the forward extremity of the short outer layer of the upper to lengthen that layer so that it will extend to the toe end of the shoe, and a heel piece for attachment to the rear portion of the outer layer of the upper to extend the body portion of the latter to full length at its heel end. Each of the illustrated toe and heel pieces comprises a fabric body impregnated with colloidal material such as pyroxylin in powdered form. Before the upper is placed upon the last the toe and heel pieces are secured to the upper so that a full length composite outer layer is provided. The upper, comprising the lining and the leather outer layer with the toe and heel pieces attached to it, is then assembled with an insole on a last and the entire upper assembly is pulled over in the usual way. Thereafter the shoe is side lasted, thus completing the operation of shaping and conforming the leather or body portion of the upper to the last. After removal of the foremost at least of the pulling-over tacks, to release the pulled-over margin of the toe piece and the corresponding portion of the lining margin, the lining is trimmed close to the insole at the toe of the shoe and solvent is applied to the marginal portion only of the toe piece to soften or activate the colloidal material therein. The toe piece with the colloidal material in its body portion still in dry or unactivated condition is now lasted, as by the use of a conventional bed lasting machine, the softened margin of the toe piece being finally wiped inwardly over and against the insole and caused, by the adhesive properties of the activated colloidal substance, to become firmly secured to the insole. The heel piece is similarly lasted and the margin of the heel piece is secured to the insole as by means of tacks. Solvent is then applied to the entire outside surfaces of the toe and heel pieces so as to thoroughly saturate the body portions of these parts and render them soft and flaccid, after which the shoe is placed in a drier where the softened toe and heel pieces are dried quickly by means of heat and thereby caused to shrink so that they will closely and smoothly conform to the last and become hardened in the desired last conforming shape. The shoe may then be finished in any conventional manner, the outsole being attached, for example, by means of cement to the overlasted margins of the upper.

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

Fig. 1 is a plan view of a shoe upper employed in practicing my improved method of shoemaking;

Figs. 2 and 3 are fragmentary sectional views on an enlarged scale taken along the lines II—II and III—III, respectively, of Fig. 1;

Fig. 4 is a perspective view of a shoe embodying the upper shown in Fig. 1, the shoe being shown in an inverted position and in the condition in which it appears after it has been side lasted and after the lasting margin of the upper lining has been trimmed at the toe of the shoe;

Fig. 5 is a sectional view of a portion of the toe of a shoe illustrating the application of solvent to the lasting margin of the toe piece;

Fig. 6 is a sectional view of a portion of the toe of the shoe illustrating the step of wiping the lasting margin of the toe piece over the insole;

Fig. 7 is a bottom view of the toe portion of the shoe showing it as it appears after the lasting margin of the toe piece has been secured to the insole;

Fig. 8 is a bottom view of the heel portion of the lasted shoe;

Fig. 9 is a perspective view of the forepart of the lasted shoe illustrating the application of solvent to the outside surface of the toe piece;

Fig. 10 is a sectional view of a shoe drier showing a lasted shoe therein and illustrating the operation of drying the toe and heel portions of the upper for the purpose of hardening them and shrinking them tightly against the last;

Fig. 11 is a sectional fragmentary view in vertical section of the toe portion of the finished shoe; and

Fig. 12 is a view similar to Fig. 11 but illustrating a modified construction.

In the illustrated shoe, as best shown in Fig. 1, the upper comprises a one-piece outer layer 18 composed of leather or other conventional upper material and an inner layer or lining consisting of a fabric vamp part 20 and a leather quarter part 22, these two lining parts being secured together by lines of stitching 24 and being secured to the outer layer 18 by means of top stitching 26. As shown, the upper edge of the outer layer 18 of the upper is covered by the usual edge binding 28. The lining parts 20, 22 are cut so that the lining will extend throughout the full length of the shoe but the outer layer 18 of the upper is cut shorter than usual in its forepart so that it will extend forwardly only to the vicinity of the toe tip line of the shoe. The outer layer 18 is also cut without any counter or heel part except for a narrow strip 32, continuous with the top portion of the upper, and arranged to extend said portion around the heel end of the foot. Secured to the forward margin of the short outer layer 18 of the upper by lines of stitching 34 so as to constitute, in effect, a forward extension of the layer 18 is a toe piece 36 composed of or containing dry, potentially plastic material which has inherent adhesive properties and is adapted to be resolved into a soft plastic and adhesive state and capable of subsequently drying and hardening and shrinking during the drying process. A heel or counter piece 38, composed of or containing the same sort of material as the toe piece 36, is secured to the rear portion of the outer layer 18 by means of stitching 40, the upper margin of the heel piece 38 being attached to the narrow upper edge portion 32 while the forward margins of the heel piece are attached to the rear edge portions 42 of the layer 18. Prior to the stitching of the toe piece to the layer 18 the margins of these parts are skived or feather edged and disposed in overlapped relation, as shown in Fig. 2, so that a flush joint is formed which enhances the appearance of the exterior of the shoe, making it appear that the outer surfaces of the toe piece and the layer 18 are continuous and insuring that no ridges will be formed in the lining 20, 22 where the latter extends beneath the joined parts of the upper. In a similar manner, and for the same purpose, the upper and forward margins of the heel piece 38 are skived and overlapped as shown in Fig. 3 before being stitched together. If desired, the narrow upper edge portion 32 of the outer layer of the upper may be dispensed with and the heel piece 38 may be cut to extend throughout the full height of the shoe and its upper edge may be covered by the edge binding 28. In such a case the heel piece will be attached to the layer 18 of the upper at the front extremities only of the heel piece. The skived margins of the toe and heel pieces are preferably secured by means of latex or other suitable cement to the respective skived margins of the upper laver 18 before being stitched to the latter so that the joints will be water tight and so that the feather edges of the upper layer (which are at the outside of the shoe) will lie closely against the outer surfaces of the toe and heel pieces throughout the life of the shoe.

Advantageously, the toe piece 36 and the heel piece 38 each consists of treated fabric of the type wherein there is contained in or on the interstices of the fabric body a potentially plastic substance which, upon being subjected to the action of a suitable solvent, will become soft and flaccid and which, upon evaporation of the solvent, will harden so that the substance (and the fabric associated therewith) will retain a desired shape which has in the meantime been imparted to it. The fabric may be either woven or structureless, as cloth or felt. Also, as herein shown, the fabric may consist of a layer 44 of woven fabric between two layers 46 of felt. The potentially plastic substance carried by the fabric may be a cellulose ester, such as pyroxylin or other colloidal substance, which is deposited in a finely comminuted or powdered form and is retained in and on the fabric by engagement of the particles of the colloidal substance with the fibers of the fabric and with each other. A suitable solvent for the colloidal substance is acetone or a mixture of acetone and denatured alcohol. The toe piece 36 is substantially flat when it is stitched to the outer layer 18 of the upper and the heel piece, which is also initially in a flat condition, is bent or curved, as indicated at 48 in Fig. 1, just prior to being stitched to the upper, the portion thus being bent that which is to overlie the extreme rear portion of the last.

The various component parts of the upper having been assembled and secured together as above described the upper, in the condition in which it appears in Fig. 1, is assembled with an insole 48 (Fig. 4) on a last 50 and the upper is pulled over in the usual way, the pulling-over operation resulting in shaping or conforming the toe piece and the heel piece to the contour of the last approximately to the same extent that the toe and heel end portions of a conventional upper are shaped by such an operation. To facilitate the conforming of the heel piece to the heightwise curvature at the rear extremity of the last the colloidal or other stiffening substance in the heel piece may be conditioned by the application of a stripe of solvent thereto along the area indicated by shading at 52 in Fig. 4. The shoe is then side lasted and the overlasted margins of the upper are secured to the insole in the shank, and in the forepart as far forwardly as the toe tip line, by suitable lasting fastenings, herein shown (in Fig. 4) as wire staples 54. At the completion of the side lasting operation the foremost of the pulling-over tacks at the toe of the shoe is removed, the fabric lining 20 is trimmed forwardly of the toe tip line close to the outer surface of the insole, as indicated at 56 in Figs. 4 and 5, and solvent is applied to the inner face of the lasting margin of the toe piece as by means of a brush 58, as illustrated in Fig. 5. In this figure, and also in Figs. 6, 11 and 12, the toe piece is shown conventionally, no attempt being made to illustrate the separate layers of felt and fabric of which it is composed.

The toe portion of the upper, which comprises the toe piece 36 and the toe portion of the lining 20, is now lasted, an operation which may be performed by hand or by means of a conventional toe lasting or bed lasting machine. After the machine has been operated in the usual manner to cause the wipers (one of which is shown at 60 in Fig. 6) to tension the toe piece heightwise of the last, the wipers are moved inwardly to operate upon the lasting margin of the toe piece which, before lasting, projects outwardly beyond the outer face of the insole substantially as illustrated in Fig. 4. The toe wipers wipe the softened margin of the piece 36 inwardly over the insole and press it downwardly and cause it, because of its softened condition, and because of the removal of the margin of the lining, to adhere to the outer surface of the insole. At the completion of this operation the over-lasted margin

of the toe piece **36** appears as shown at **62** in Fig. 7. At the heel end of the shoe the heel piece **38** is then lasted, as by means of the bed lasting machine or a heel seat lasting machine and the margin of the heel piece is wiped inwardly and flattened against the insole, as shown at **63** in Fig. 8, by the action of the heel wipers after which the overwiped margin of the heel piece may be secured to the insole by means of tacks **64**. The lasting margin of the heel piece **38** may be softened by means of a solvent, if desired, before the heel seat of the shoe is lasted, to facilitate the wiping of the lasting margin inwardly over the work.

As the result of the above-described lasting operations, the toe piece **36** and heel piece **38** are shaped into substantial conformity with the last but inasmuch as the material of which these pieces are formed is not as freely stretchable as leather or other conventional upper material there is liable to be some undesirable fullness and more or less wrinkles particularly over those portions of the last where the curvature is most abrupt as at the point of the toe and at the rear of the heel. In order to insure that the toe and heel pieces will be conformed tightly and smoothly to the last the following procedure is carried out. Solvent is applied, as by means of a brush, to the entire outside surface of the toe piece **36**, as illustrated in Fig. 9, and also, in a like manner, to the entire outside surface of the heel piece **38**, a sufficient amount of solvent being applied to saturate the pieces thoroughly and render the colloidal material coalescent and the fabric flaccid. The toe and heel pieces or portions of the upper are then allowed to dry, while the shoe remains on the last, thereby causing the colloidal, or other potentially plastic material, to become hard and stiff and to shrink during the drying and hardening process. Preferably the drying operation is effected by evaporating the solvent quickly as by means of heat, the shoe being advantageously placed in a drier or oven for this purpose, as indicated in Fig. 10, where currents of air heated, as by means of electric heating units **66**, are caused to flow past the softened toe and heel pieces thereby quickly drying and hardening the pyroxylin or other colloidal material which they contain. The drying causes the colloidal material, and the fabric associated therewith, to shrink as they dry so that the toe and heel pieces will become closely and tightly conformed to the contour of the last and thus the shape of the last will be accurately reproduced and the toe and heel portions of the shoe upper will be entirely without undesirable fullness or wrinkles. When thoroughly dried and hardened the toe and heel portions of the upper will have exceptional strength and they will be capable of resisting wear to a substantially greater extent than the body portion of the upper. The hardened colloidal material will render the toe and heel portions of the upper stiff but resilient. Moreover, in addition to being formed smoothly and accurately to last conforming shape, the toe and heel pieces will retain their shapes throughout the life of the shoe.

After the toe and heel pieces have become thoroughly dry, their outer surfaces may be finished to match or blend with the surface finish of the body portion of the upper by coating these surfaces with lacquer or other suitable finishing material. A finishing material for the surfaces of the toe and heel pieces may be selected which will simulate the surface appearance of the leather portion of the upper, thus making the shoe appear to have an all-leather upper. This finishing of the toe and heel pieces may take place at any time after the shoe has been removed from the drier. All other operations necessary to complete the shoe, such as outsole attaching, heel attaching, sole edge finishing, etc., may be carried out in the regular routine of manufacture. The outsole **68**, for example, may be cement attached to the overlasted margins of the upper including those of the toe and heel pieces **36** and **38**, or it may be attached by through-and-through stitching. The heel attaching may be conventional in all respects.

To conserve upper lining material the lining of the upper, instead of being made to extend throughout the full length of the shoe as hereinbefore described, may be cut short so that it will extend forwardly only approximately as far as the toe tip line of the shoe and the inner surface of the hardened and conformed toe piece **36** may be coated with flock, small particles of lint, or the like, as indicated at **70** in Fig. 12, to provide, at the inner side of the toe piece, a soft surface finish which will function in effect as a continuation of the shortened lining preventing the hardened material of the toe piece from directly engaging the foot and thus contributing to comfort in the wearing of the shoe. This procedure of cutting the lining short will, of course, eliminate the step of trimming the lining at the toe. A further saving of lining material may be effected by cutting the upper lining short at its heel end and applying a coating of flock or similar material to the inner surface of the heel piece **38**.

If the lining is cut short at both the toe and heel ends the toe and heel pieces will constitute the only upper elements in the toe and heel portions of the shoe. If a full length lining is employed the only upper elements at the heel and toe of the shoe will be the heel and toe pieces and the lining. Thus the practice of my improved method of shoemaking results in a substantial saving of upper material. It renders unnecessary the use of toe and heel stiffeners such as box toes and counter stiffeners and eliminates the expense incident to the manufacture and application of such devices. Moreover, the shoe will be made by the use of conventional shoemaking machinery such as pulling over, side lasting and bed lasting machines which are available in all shoe factories. The toe and heel portions of the upper of the completed shoe will have all the desirable characteristics of premolded toe and heel pieces but no expensive molding operations will be involved.

While my invention has been herein described in connection with the manufacture of McKay type or cement process shoes, it may be practiced in the manufacture of welt shoes. In making welt shoes, the lasting margin of the toe piece, after having been softened, may be secured to the insole by the adhesive properties of the softened toe piece material without the use of the usual toe wire and anchor tacks thereby saving the time ordinarily consumed by the operations of applying and removing these temporary fastenings.

It is to be understood that instead of employing a colloidal substance as the means for imparting the desired stiffness and shape-retaining characteristics to the end portions of the upper, other suitable substances may be employed which are capable of being softened or activated by means of a solvent and which may subsequently be dried

and hardened by means of heat and which will shrink in the course of the drying and hardening process.

It is also to be understood that in preparing the upper for assembly with the insole the upper may be cut short only at its toe end, in which case a toe piece comprising colloidal or other potentially plastic material will be attached to the upper but no heel piece comprising such material will be employed and that, conversely, the upper may be cut short only at its heel end, in which case a heel piece of potentially plastic material will be attached to the upper but no toe piece of that nature will be employed.

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 shoemaking which consists in providing an upper the entire toe portion of which is substantially stiffer than the rest of the upper and comprises material capable of being resolved by means of a solvent into a softened plastic condition and of hardening and shrinking upon evaporation of the solvent, tensioning the upper over a last thereby shaping the upper so that it fits tightly and smoothly over the last rearwardly of said toe portion but in said portion is less tightly and smoothly conformed to the shape of the last, securing the margin of the upper in overlasted position upon an insole on the last, applying a solvent to said toe portion of the lasted upper thereby resolving said material into a softened plastic condition, and allowing said softened material to harden while the shoe remains on the last and thereby to shrink into smooth and tight fitting relation to the last.

2. That improvement in methods of shoemaking which consists in providing an upper the toe portion of which is less freely stretchable than the rest of the upper, said toe portion comprising dry stiff material capable of being resolved by means of a solvent into a softened plastic condition and of hardening and shrinking upon evaporation of the solvent, tensioning the upper over a last while said material is in a dry condition whereby the portion of the upper rearwardly of the toe is caused to fit more smoothly and tightly upon the last than said toe portion, securing the margin of the upper in overlasted position upon an insole on the last, applying a solvent to said toe portion of the lasted upper thereby resolving said material into a softened plastic condition, and subsequently drying said material rapidly while the shoe remains on the last thereby causing said toe portion to dry and harden and to shrink during the drying and hardening process so that it will fit the last smoothly and tightly.

3. That improvement in methods of shoemaking which consists in providing an upper comprising an outer layer cut short at its toe end and a lining, said outer layer having a toe piece secured to it and forming a forward extension thereof and said toe piece consisting of stiff material capable of being softened by a solvent and of shrinking upon subsequent evaporation of the solvent, assembling said upper with an insole on a last, side lasting the shoe, softening the marginal portion only of said upper extension, working said extension over the last while the body portion of said extension remains stiff thereby to effect an initial shaping of said extension to the last, laying the softened marginal portion of said extension over the insole and securing it thereto, and thereafter, and while the shoe is on the last, softening the body portion of said extension and allowing it to dry on the last thereby causing it to shrink to conform tightly and smoothly to the last.

4. That improvement in methods of shoemaking which consists in providing an upper having a lasting margin and having one end portion which comprises potentially plastic material in a dry state, said material being capable of being resolved by means of a solvent into a plastic condition having inherent adhesive properties and of hardening and shrinking upon evaporation of the solvent, tensioning the body portion of the upper over a last and securing the lasting margin of said portion of the upper in overlasted position upon an insole on the last, applying a solvent to the lasting margin only of said end portion of the upper thereby resolving the material in said margin into a soft plastic condition, tensioning said end portion of the upper over the last and wiping the lasting margin of said end portion inwardly over the insole thereby causing said lasting margin to be secured to the insole by the inherent adhesive properties of the plastic material, applying a solvent to the previously unsoftened part of said end portion of the upper thereby resolving the potentially plastic material contained therein into a softened plastic condition, and finally drying said end portion of the upper thereby causing it to harden and shrink while on the last to conform it accurately to the shape of the last.

5. That improvement in methods of shoemaking which consists in providing an upper one end portion of which comprises a fabric having its interstices filled with powdered colloidal material, working the upper including said end porton over a last and securing the margin of the upper in overlasted position upon an insole on the last, applying a solvent for said colloidal material to said end portion of the upper thereby converting said portion into a coalescent flaccid state, and then applying heat to said end portion of the upper thereby causing said material to dry and harden and to shrink during the drying and hardening process so that said end portion will be tightened over the last and accurately conformed thereto.

6. That improvement in methods of shoemaking which consists in providing an upper which is cut short at one end, extending the upper by securing to its shortened extremity an end piece comprising dry material capable of being rendered plastic by the action of a solvent thereon, working the upper and said end piece over a last and securing the margins of said parts in overlasted position upon an insole on the last, thereafter applying solvent to said end piece thereby resolving said material into a plastic condition, and finally drying said end piece while the shoe remains on the last thereby causing said material to harden in conformity with the shape of the last.

7. That improvement in methods of shoemaking which consists in providing an upper which is cut short at its toe and heel ends, extending the upper by securing to its toe and heel ends a toe piece and a heel piece, respectively, each of said pieces comprising dry material capable of being rendered plastic by the action of a solvent thereon, working the upper including said toe and heel pieces over a last and securing the lasting margin of the extended upper in overlasted

position upon an insole on the last, thereafter applying to said toe and heel pieces a solvent for said material while the shoe remains on the last thereby resolving said material into a plastic condition, and finally drying said material before removing the shoe from the last, thereby causing said toe and heel pieces to be conformed to the shape of the last.

8. That improvement in methods of shoemaking which consists in providing an upper having no counter or heel part except for a narrow strip continuous with the top portion of the upper and arranged to extend said portion around the heel end of the foot, attaching a counter or heel piece to said strip and to the rear extremities of said upper below said strip thereby extending the rear of said upper to full height and length, said counter or heel piece comprising dry material capable of being rendered plastic by the action of a solvent thereon, working the upper including said counter or heel piece over a last and securing the lasting margin of the upper in overlasted position upon an insole on the last, thereafter applying to said counter or heel piece a solvent for said material thereby resolving said material into a plastic condition, and finally drying said material while the shoe remains on the last, thereby causing said counter or heel piece to be conformed to the shape of the last.

9. That improvement in methods of shoemaking which consists in providing an upper having no toe portion, securing to the forward extremity of the upper the rear extremity of a toe piece containing powdered colloidal material, working the upper and said toe piece over a last and securing the margins of said parts in overlasted position upon an insole on the last, applying to said toe piece a solvent for said colloidal material thereby activating the latter, and thereafter applying heat to said toe piece while the shoe remains on the last, thereby drying and hardening said colloidal material and causing said toe piece to conform smoothly to the shape of the last.

10. That improvement in methods of shoemaking which consists in providing an upper having no toe portion, securing to the forward extremity of the upper a toe piece having a lasting margin, said toe piece and said lasting margin containing powdered colloidal material, working the upper over a last and securing the lower margins of the upper in overlasted position upon an insole on the last, applying a solvent for colloidal material to the lasting margin only of said toe piece thereby resolving the colloidal material in said margin into a plastic condition, working said toe piece over the last and wiping the lasting margin thereof over an insole on the last thereby securing said margin to the insole by the inherent adhesive properties of said colloidal material, thereafter applying a solvent for colloidal material to the body portion of said toe piece thereby resolving the colloidal material in said body portion into a plastic condition, and finally evaporating the solvent from said body portion while the shoe remains on the last thereby causing said toe piece to conform smoothly to the shape of the last.

11. That improvement in methods of shoemaking which consists in providing an upper having a toe portion consisting of a fabric having its interstices filled with powdered pyroxylin, working the upper over a last and securing the margin of the upper in overlasted position upon an insole on the last, applying a solvent for said pyroxylin to said toe portion thereby resolving said pyroxylin into a plastic state, and subjecting said toe portion to heat thereby drying said pyroxylin quickly while the shoe remains on the last, thereby causing said toe portion to be conformed accurately to the shape of the last.

12. That improvement in methods of shoemaking which consists in providing an upper comprising an outer layer which is cut short at its toe end and a full length inner layer or lining, each of said layers having a lasting margin, extending said outer layer by securing to its shortened extremity a fabric toe piece impregnated with pyroxylin in powdered form, working the upper and said toe piece over a last and securing the margin of the upper in overlasted position upon an insole on the last, trimming off the lasting margin of said lining in the toe of the shoe, applying to the lasting margin of said toe piece a solvent for pyroxylin thereby resolving the pyroxylin in said margin into a plastic condition, wiping said lasting margin inwardly over said insole and securing it to the insole by the inherent adhesive properties of said pyroxylin, applying a solvent for pyroxylin to the remainder of said toe piece thereby resolving the pyroxylin therein into a plastic condition, and drying said toe piece while the shoe remains on the last thereby causing the toe piece to harden in conformity with the shape of the last.

13. That improvement in methods of shoemaking which consists in providing an upper of conventional upper material having a finished outer surface, said upper being cut short at one end, extending the upper by securing to its shortened extremity an end piece comprising dry, potentially plastic material capable of being rendered plastic by the action of a solvent thereon, tensioning the upper, including said end piece, over a last and securing the margin of the upper in overlasted position upon an insole on the last, applying to said end piece a solvent for said potentially plastic material thereby resolving said material into a plastic condition, drying said end piece rapidly while the shoe remains on the last, thereby causing said end piece to harden to the shape of the last, and applying a coating to the outer side of said hardened end piece to provide a finished outer surface simulating that of said upper material.

14. The method of shoemaking which consists in providing an upper consisting of an outer layer and a lining each of which is cut short at one end, extending the upper by securing to the shortened extremity of said outer layer an end piece comprising a fabric having its interstices filled with powdered colloidal material, working the upper, including said end piece, over a last and securing the margin of the upper in overlasted position upon an insole on the last, applying to said end piece a solvent for said colloidal material thereby resolving it into a softened state, drying said end piece quickly while the shoe remains on the last thereby hardening said piece in a shape conforming to that of the last, removing the last, and coating the inside of said end piece with a layer of flock to provide a lining thereon.

GEORGE A. MINER.