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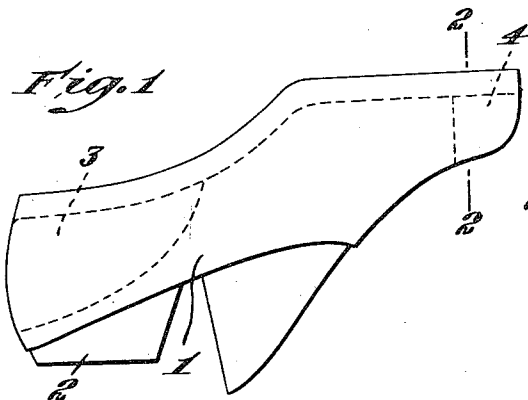
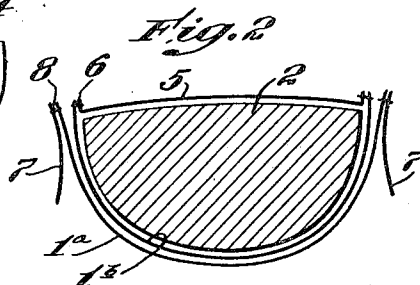
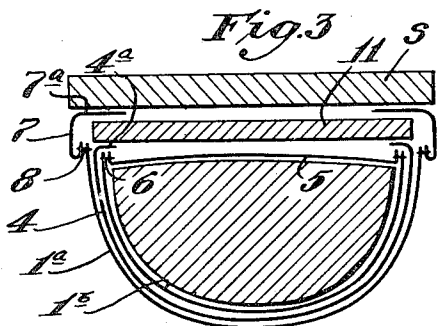
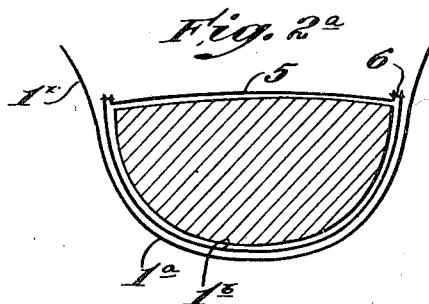
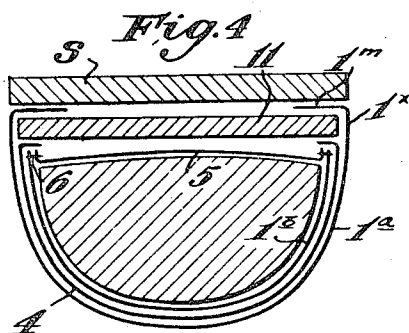
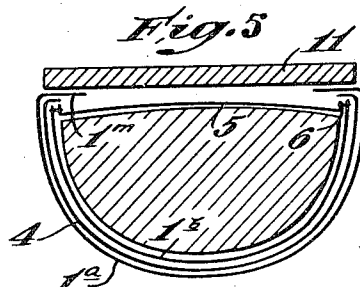
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2,446,286

FORCE LASTED SHOES AND METHOD OF MAKING SAME

Filed Sept. 22, 1943

3 Sheets-Sheet 1



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FORCE LASTED SHOES AND METHOD OF MAKING SAME

Filed Sept. 22, 1943

3 Sheets-Sheet 2

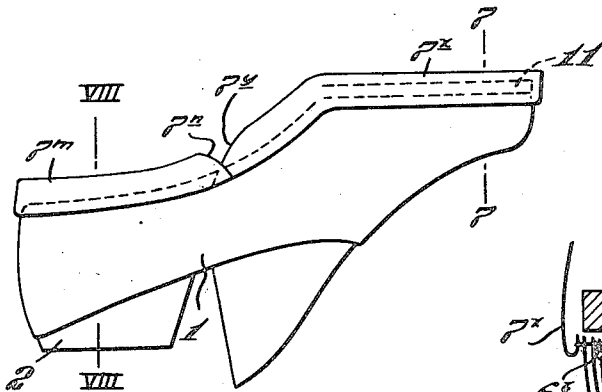


Fig. 6

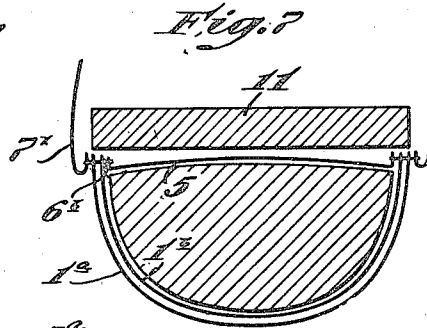


Fig. 7

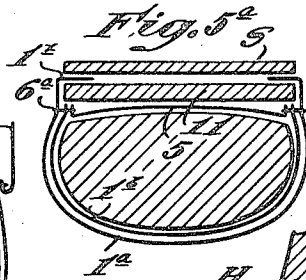


Fig. 5a

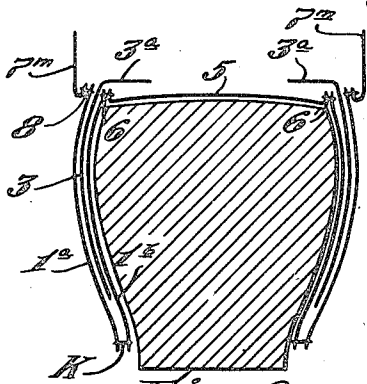


Fig. 8

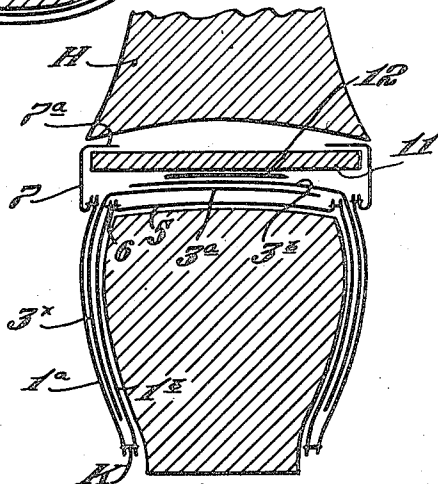


Fig. 9

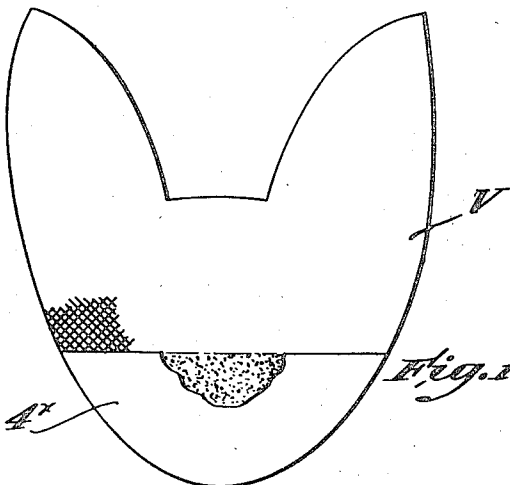


Fig. 10

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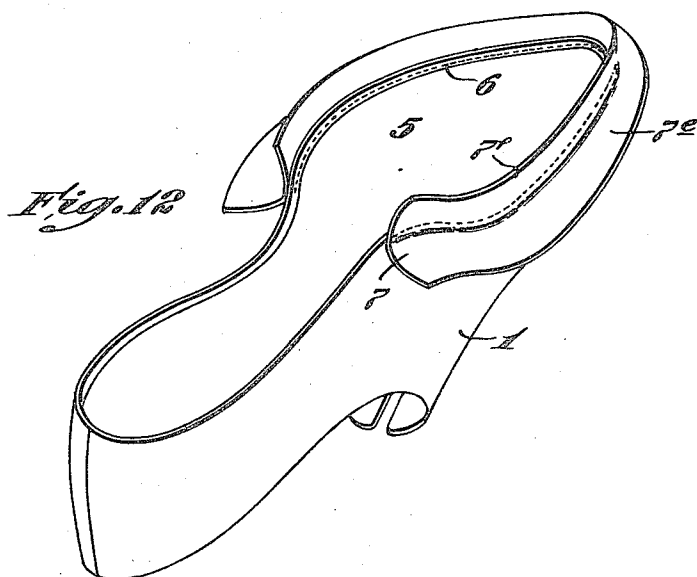
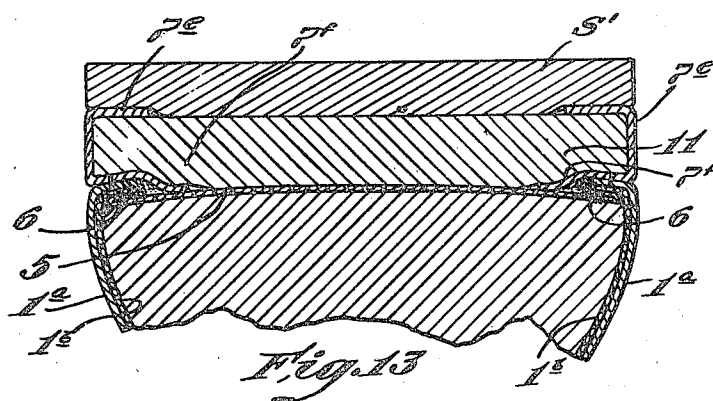
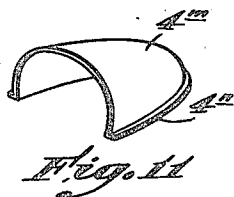
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FORCE LASTED SHOES AND METHOD OF MAKING SAME

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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

2,446,286

FORCE LASTED SHOE AND METHOD OF MAKING SAME

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Application September 22, 1943, Serial No. 503,336

22 Claims. (Cl. 36—19.5)

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This invention relates to the manufacture of footwear, and while in certain aspects it is of broader utility, it is more particularly concerned with the manufacture of the so-called "slip lasted," "California," "platform" or "force-lasted" type. In this type of shoe the usual stiff inner sole is omitted and replaced by a thin, soft and flexible sole element (commonly termed the "sock lining" in this type of shoe) customarily of textile fabric and which is stitched directly to the upper prior to lasting. A middle sole, usually comprising a thick, soft and cushion-like element, semi-sole or "platform" is cemented to the under side of the sock lining, and an outer sole is cemented to the under surface of the middle sole. The upper is provided with a skirt portion, "extension," "wrapper" or "platform casing" of flexible material which continues downwardly from approximately the level of the sock lining, and which covers and protects the edges of the middle sole, the lower margin of the wrapper being interposed between the middle and outer soles.

Hitherto it has been customary to sew the wrapper to the lower margin of the upper, the sewing stitches passing through all of the various constituent plies (including the outer element and lining) of the upper. Since this sewed seam which permanently unites the several plies of the upper is substantially at the level of the last bottom, it is impossible to dispose a moulded flanged counter or toe box between the lining and the outer element of the upper.

One of the objects of the present invention is to provide a novel shoe embodying the recognized economies of force lasting, but which comprises a toe box or a counter or both, and to provide a novel method of making such a shoe.

As above noted, it is customary to make the wrapper as a separate element which is united to the lower portion of the upper proper by a sewed seam, but in accordance with one embodiment of the present invention, it is contemplated that this wrapper may be integral with the outer member of the upper, thereby eliminating the external shoulder which occurs at the junction of the upper and wrapper in prior shoes of this type. By this novel arrangement hereby provided, the shoe is made to appear more nearly like shoes lasted according to conventional methods. These and other objects and advantages of the invention will be pointed out more fully in the following detailed description and by reference to the accompanying drawings wherein

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in accordance with one embodiment of the present invention;

Fig. 2 is a transverse diagrammatic section, to larger scale, through the toe end of the shoe, for example, in the plane of line 2—2 of Fig. 1;

Fig. 2^a is a view similar to Fig. 2 but illustrating a slight modification;

Fig. 3 is a view similar to Fig. 2 but showing the upper after the toe box and middle sole have been assembled with the upper and after the margin of the wrapper has been wiped in over the bottom of a sole member;

Fig. 4 is a view similar to Fig. 3, illustrating the upper of Fig. 2^a at the same stage in the operation as is shown in Fig. 3;

Fig. 5 illustrates a further modification at the same stage in the operation as that illustrated in Figs. 3 and 4;

Fig. 6 is a side elevation similar to Fig. 1 but illustrating an upper of further modified type;

Fig. 7 is a section on the line 7—7 of Fig. 6;

Fig. 8 is a section on the line VIII—VIII of Fig. 6;

Fig. 9 is a diagrammatic transverse section through the rear portion of a shoe made in accordance with one embodiment of the invention, the shoe including a counter, a shank piece and heel;

Fig. 10 is a plan view of an unlasted vamp provided with a toe stiffener element useful in accordance with one embodiment of the invention;

Fig. 11 is a perspective view showing one type of moulded toe box or stiffener which may be employed in accordance with this invention;

Fig. 12 is a perspective view of a shoe upper comprising a wrapper of modified type and having a sock lining secured to the upper; and

Fig. 13 is a transverse section, to larger scale, through the forepart portion of a lasted shoe of the type shown in Fig. 12, the middle and outer soles being attached.

Referring to the drawings the numeral 1 designates the upper of a shoe, shown in Fig. 1 as mounted upon a last 2, the upper including a moulded counter 3 and a toe box or stiffener 4.

In accordance with one procedure, as illustrated in Fig. 2, the upper comprises an outer element 1^a which may be of leather, fabric or the like, and a lining 1^b. The lining 1^b is cut with but little lasting allowance and is secured by the stitched in seam 6 to the margin of a sock lining 5. This sock lining may be of any suitable material but is usually quite thin as compared with the conventional insole and is of textile fabric or the like. As illustrated in Fig. 2, the in seam stitches

Fig. 1 is a side elevation of a lasted upper made

do not pass through the outer element 1^a of the upper. The outer element 1^a is cut to substantially the same dimensions as the lining 1^b but has a wrapper 7 secured to its lower edge by the seam 8. This wrapper may be of any suitable material, for example like that of the outer element 1^a of the upper or some different material, for example, if the part 1^a be leather, the wrapper 7 may be textile fabric.

Since the lining 1^b and the outer element 1^a are not connected at their lower edges it is readily possible to insert stiffener elements between these parts of the upper at the toe or heel end or both. For example, a moulded toe box 4 may be inserted at the toe of the shoe, for instance by turning back the outer member 1^a of the upper, so as to expose the forward end of the lasted lining, and after the toe box has been put in position and cemented to the lining and preferably externally coated with adhesive, the outer element 1^a may be turned down so as to cover the toe stiffener. Likewise at the heel end of the shoe a moulded counter, of more or less conventional type if desired, may be introduced between the outer element 1^a and the lining of the upper. According to customary shoemaking practice this counter may be coated with adhesive before introduction. After the last is introduced the middle or cushion sole or platform 11 is applied as hereinafter described.

As illustrated in Fig. 3, which is a diagrammatic section through the toe end of the shoe, the stiffener 4 is interposed between the outer member 1^a and the lining 1^b of the upper with the inwardly directed flange 4^a of the stiffener or box directed inwardly and overlying the insole 6. The last having been inserted, either before or after the introduction of the end stiffener or stiffeners, the under surface of this flange 4^a and the under surface of the sock lining 5 may now be coated with adhesive; the middle sole 11 applied; the wrapper turned downwardly to conceal the edge of the middle sole, and the marginal portion 7^a of the wrapper lasted-in over and adhesively united to the under surface of the middle sole in the customary manner. This in-lasting of the margin of the wrapper may be performed in any desired manner, but is accomplished very readily by the employment of a lasting machine such as that disclosed in the patent to Kamborian No. 2,251,285, dated August 5, 1941. After the middle sole has thus been applied and the margin of the wrapper wiped or lasted-in, an outer sole may be secured by adhesive to the under surface of the middle sole 11, the outer sole concealing the marginal portions 7^a of the wrapper.

Instead of employing a premoulded toe box or stiffener it is possible to provide the desired stiffness at the toe by the use of a stiffener of thermoplastic character. For convenience this stiffener 4^x may be attached (Fig. 10) to the inside surface of the outer element of the vamp V, and after the last has been introduced into the upper so as to distend the upper lining 1^b and the sock lining 5, the outer element 1^a of the upper is subjected to suitable treatment, for example in a steam box, such as to soften the stiffener material 4^x. The toe portion of the outer element of the upper, together with the softened stiffener, is conformed to the toe end of the last during the in-lasting of the wrapper.

While as illustrated in Fig. 3 the flange 4^a of the toe box 4 is turned inwardly, it is within the scope of the invention to employ a toe box 4^m such as shown in Fig. 11, having an out-

turned flange 4ⁿ. Such a toe box may be employed in a force-lasted shoe of the stitch-down type, in which the wrapper is turned outwardly and sewed to the projecting margin of the outer sole.

While in Figs. 2 and 3 the wrapper 7 is shown as a separate element secured to the outer member 1^a by the insole 8, it is contemplated that in accordance with this invention the wrapper may be an integral portion of the outer element of the upper. Thus as illustrated in Figs. 2^a and 4 the outer element 1^a is furnished with the integral skirt portion 1^x designed to constitute the wrapper. As shown in Fig. 4, an end stiffener member 4 has been introduced between the outer element 1^a and the lining 1^b, with its flange overlying the insole 6. The middle sole 11 has been put in place and the marginal portion 1^m of the integral wrapper 1^x has been lasted-in over the bottom of the middle sole. In Fig. 5 a slight modification is illustrated wherein the marginal portion 1^m of the integral wrapper 1^x is lasted-in directly over the sock lining and over the insole and the sole S is applied so as to conceal this lasted-in portion of the wrapper.

In Fig. 6 there is illustrated a shoe embodying certain of the above features and having the upper 1 mounted on the last 2 but having separate wrapper elements 7^x and 7^m at its toe and heel portions, respectively. As shown in Fig. 7, at the forepart of the shoe, the lining 1^b of the upper is united to the margin of the sock lining 5 and to the wrapper element 7^x by the insole 6^b. With this arrangement it is not possible to insert a premoulded toe box. The middle sole 11 is secured to the sock lining 5, and the margins of the wrapper 7^x are lasted-in over the bottom of the middle sole, the wrapper 7^x terminating at 7^v at the shank portion of the shoe.

At the heel end of the shoe, as shown in Fig. 8, the outer element 1^a and heel lining 1^b of the upper (which are united at the top of the shoe by the seam K) are not united by the insole 6, the latter merely securing the lining 1^b to the sock lining 5, while the wrapper 7^m is attached by the seam 8 only to the lower edge of the member 1^a. This makes it possible to introduce between the parts 1^a and 1^b the premoulded counter 3 having the inwardly directed flange 3^a. The middle sole may be of a length such as to cover the sock lining 5 at the heel end of the shoe, and the marginal portion of the wrapper 7^m may be lasted-in over this heel portion of the middle sole; the wrapper 7^m terminating at 7ⁿ as illustrated in Fig. 6. The outer sole may then be attached in the usual way.

While a moulded counter of conventional form may be employed, such a counter must be lasted and tacked, operations which to some extent reduce the economies of force lasting. Thus it is contemplated that improved results may be obtained by employing a counter which need not be lasted or tacked, for example a counter such as diagrammatically illustrated in Fig. 9 and which is more fully disclosed and claimed in the patent to Kamborian No. 2,393,989 dated February 5, 1946. This counter 3^x of Fig. 9 comprises overlapping flange portions 3^a and 3^b, each of which is of substantially the same width as the bottom of the shoe, the two flanges overlapping, as shown in Fig. 9, to form a two-ply bottom or heel plate which greatly improves the anchorage for the heel and which may if desired extend from the rear end of the shoe forwardly to the ball of the shoe to constitute a shank piece. If

desired a metal stiffener element 12 may be associated with this two-ply bottom or heel plate and shank in order to furnish additional stiffness and anchorage for the heel. The middle sole 11 extends rearwardly over this two-ply shank piece and stiffener 12, and the marginal portion 7^a of the wrapper is lasted-in over this middle sole, and the heel H is secured, for example by fasteners (not shown) extending through the sock lining 5, the shank piece members 3^a and 3^b, the stiffener 12, and the middle sole 11.

In Figs. 12 and 13 a further modification is illustrated wherein the upper 1 is shown as secured to the sock lining 5 by the inseam 6. In this case the wrapper 7 is secured to the upper by a seam (which may be the inseam 6 or an independent seam), this seam extending along the wrapper intermediate the opposite edges of the latter, thereby defining two flaps 7^e and 7^f. After the last has been inserted in the upper the flap 7^f may be employed in applying stress for drawing the inseam inwardly over the bottom of the last, and this flap 7^f is secured by adhesive to the under surface of the sock lining. The middle sole 11 is now put in place, the other flap 7^e of the wrapper is drawn around the edges of the middle sole, and its free margin is secured to the under side of the middle sole, and the outer sole S' is then attached.

While the term "force-lasted" has herein been adopted as an accurate and convenient designation, it is to be understood that this term signifies any shoe or article of footwear of the so-called "California," platform," "slip-lasted" or similar type.

While certain desirable embodiments of the invention have been illustrated and the mode of making the several modified structures has been described by way of example, it is to be understood that the invention is not necessarily limited to the precise arrangements or procedures thus disclosed, but is to be regarded as broadly inclusive of any and all modifications falling within the scope of the appended claims.

I claim:

1. A force-lasted shoe of the kind having a sock lining and an upper, the upper comprising a plurality of plies, characterized in that the forepart portion of the upper comprises a wrapper whose upper margin is permanently united by stitches to the sock lining and to all of the constituent plies of the upper, and further characterized in having at its heel end portion a wrapper whose upper margin is secured by stitches to the outer ply only of the upper, the lining only of the upper being united by stitches to the sock lining, and a flanged stiffener interposed between the outer member of the upper and the lining of the upper.

2. A force-lasted shoe of the kind having a sock lining and an upper, the upper comprising a plurality of plies, characterized in that the upper margin of a wrapper is permanently united by stitches to the outer ply only of the upper, the lining ply of the upper being permanently united by stitches to the sock lining.

3. A force-lasted shoe of the kind having a sock lining and an upper, the latter comprising a lining ply and an outer ply characterized in that the lining ply only of the upper is permanently united by an inseam to the sock lining and in having a wrapper which is joined to the outer ply only of the upper, a moulded end stiffener interposed between the outer ply and the lining of the upper at one end of the shoe, said

stiffener having an integral portion which underlies the inseam, and a middle sole united to the sock lining and underlying the flange of the stiffener, the lower margin of the wrapper underlying the middle sole.

4. A force-lasted shoe of the kind having a sock lining and an upper, the latter comprising a lining ply and an outer ply, characterized in that the lining ply only of the upper is permanently united by an inseam to the sock lining and in having a wrapper joined to the outer ply of the upper but free from the lining ply of the upper, and a moulded end stiffener interposed between the outer and lining plies of the upper at one end of the shoe, the stiffener having a substantially horizontal flange which underlies the inseam.

5. That method of making force-lasted shoes which comprises as steps providing a sock lining and an upper including a lining and an outer ply, the outer ply having a wrapper united thereto, uniting the sock lining to the lower edge of the upper lining while leaving the outer ply free from the sock lining, introducing a last into the upper, disposing an end stiffener between the upper lining and the outer ply of the upper at one end of the shoe, securing a middle sole to the sock lining, lasting-in the margin of the wrapper over the under side of the middle sole, and applying an outer sole.

6. That method of making force-lasted shoes which comprises as steps providing a sock lining and an upper including a lining and an outer ply, the outer ply having a wrapper joined thereto, uniting the edge of the sock lining to the edge of the upper lining while leaving the outer ply of the upper free from the sock lining, inserting a flanged end stiffener into one end of the upper between the upper lining and the outer ply, disposing the stiffener flange beneath the margin of the sock lining, introducing a last into the upper, conforming the stiffener to the end of the last while uniting it to the lining, disposing a middle sole in contact with and uniting it to the sock lining, turning the free margin of the wrapper inwardly against the under surface of the middle sole, and uniting an outer sole to the middle sole.

7. That method of making force-lasted shoes which comprises as steps providing a sock lining and an upper including a lining and an outer ply, the outer ply having a wrapper joined thereto, securing the sock lining to the lower edge of the upper lining thereby forming an inseam while leaving the outer ply of the upper free from the sock lining, disposing an end stiffener between the upper lining and the outer ply of the upper at one end of the shoe, introducing a last into the upper, spindling the upper with reference to the last, causing the stiffener to adhere to the outer ply and lining of the upper, attaching a cushion sole to the under surface of the sock lining, laying the margin of the wrapper inwardly against the under side of the cushion sole and applying an outer sole.

8. That method of making force-lasted shoes which comprises as steps providing a sock lining and an upper including a lining and an outer ply, the outer ply having a wrapper joined thereto and the upper lining having a thermoplastic stiffening element attached to it at its toe end, uniting the edge of the sock lining to the upper lining but leaving the outer ply of the upper free from the sock lining, causing the stiffener element of the lining to become plastic, introducing the last into the upper, conforming the toe part of the lining

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with its stiffener element to the shape of the last, applying a middle sole to the under surface of the sock lining, wiping-in the margin of the wrapper against the under surface of the middle sole, and attaching an outer sole.

9. That method of making force-lasted shoes which comprises as steps providing a sock lining and an upper including a lining and an outer ply, the outer ply having wrapper elements united to its forepart portion and to its rear portion respectively, inseaming the sock lining to the lower edge of the upper lining and to the outer ply of the upper at the forepart of the shoe, inseaming the sock lining and the lower edge of the upper lining at the rear portion of the shoe while leaving the outer ply free from the sock lining, disposing a flanged counter between the upper lining and the outer ply of the upper at the rear of the shoe, with the flange of the counter overlying the inseam, introducing a last into the shoe, attaching a middle sole to the under surface of the sock lining, wiping the free margins of the wrapper elements inwardly against the under surface of the middle sole, and applying an outer sole.

10. The method of making a force-lasted shoe which comprises providing an upper having an outer element and a liner secured together along their top edges, and a sock lining securing the sock lining along its marginal portion to the lower edge of said liner, the lower marginal portion of said outer element of the upper being free and being joined to a wrapper element, inserting a toe box between the outer element and liner at the toe portion of the upper, inserting a counter between the outer element and liner at the rear portion of the upper, inserting a last into the upper, wiping-in and securing the wrapper element to the marginal portion of said sock lining, and thereafter applying a sole member.

11. The method of making a force-lasted shoe which comprises providing an upper having an outer element and a liner secured together along their top edges, and a sock lining, securing the sock lining along its marginal portion to the lower edge of said liner only, the lower marginal portion of said outer element being free and being joined to a wrapper element, inserting between the outer element and liner at the toe portion of said upper a toe box temporarily rendered plastic and adhesive, inserting a last into the upper, while the toe box is in such condition conforming the parts to the last and at the same time cementitiously uniting the toe box to the adjacent parts of the outer element and liner, inserting a moulded counter between the outer element and liner at the rear portion of the upper and cementitiously uniting it thereto, wiping-in and securing the wrapper element to the marginal portion of said sock lining member, and thereafter applying a sole member.

12. The method of making a force-lasted shoe which comprises providing an upper having an outer element and a liner secured together along their top edges, and a sock lining, securing the sock lining along its marginal portion to the lower edge of said liner, the lower marginal portion of said outer element being free and joined to a wrapper element, inserting a toe box between the outer element and liner at the toe portion of the upper, inserting a moulded counter between the outer element and liner at the rear portion of the upper and cementitiously uniting the counter to the upper, introducing a last into the upper, securing a middle sole to the sock lining, wiping-in and securing said wrapper element to said middle

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sole, and thereafter applying an outsole and heel.

13. A force-lasted shoe of the kind having a sock lining, a multi-ply upper comprising a lining and an outer element, and a middle sole, characterized in that the margin of the sock lining is permanently united by stitches to the lower edge of the lining only of the upper, that the upper margin of a wrapper is permanently united by stitches to the outer element of the upper, that the middle sole is secured to the bottom surface of the sock lining over the united margin of the sock lining and the lower edge of the lining of the upper and that the wrapper is lasted-in over the edge of said sole upon the bottom surface thereof.

14. A force-lasted shoe of the kind having a sock lining, a multi-ply upper comprising a lining and an outer element, a flanged end stiffener and a middle sole, characterized in that the margin of the sock lining is permanently united by stitches to the lower edge of the lining of the upper, that the upper margin of a wrapper is permanently united by stitches to the outer element of the upper, that said outer element is free from the lower edge of the lining of the upper, that the stiffener is disposed between the outer element and the lining of the upper with its flange bearing upon the united edges, that the middle sole is secured to the bottom surface of the sock lining and the exposed portion of the flange of the stiffener, and that the wrapper is lasted-in over the edge of said sole upon the bottom surface thereof.

15. In a shoe, the combination of an inner sole, a platform and an outer sole in laminar relation, a stiff counter having a turned-in flange extending between the innersole and platform, a counter liner, stitching securing the heel margin of the inner sole to the bottom margin of said counter liner, and a platform cover strip having its top margin stitched to the lower margin of said upper and its lower margin underlying and adhesively secured to the platform.

16. In a shoe, an inner sole, a counter liner marginally secured to the heel margin of said inner sole, an upper having a heel portion in which said counter liner is disposed, a platform cover strip stitched to the bottom margin of said upper, a stiff counter laminated between said counter liner and upper, said counter having a bottom flange extending below said inner sole, a platform member and an outer sole in underlying relation to said inner sole, said platform cover strip extending about the edge of said platform and being marginally secured between the platform and outer sole.

17. In a shoe, an upper having a forepart and a heel part, a sole liner having a sole part and a heel part, means marginally securing the forepart of said upper to the forepart of said liner, the heel part of said upper being marginally unattached to the heel part of said liner, a counter liner disposed within the heel part of said upper, means marginally securing the heel part of said sole liner to the lower edge of said counter liner, means marginally securing the upper edge of said counter lining to said upper, and a rigid counter disposed between the heel part of said upper and said counter liner, said counter having a marginal flange underlying the heel part of said sole liner.

18. In a shoe, an upper having a forepart and a heel part, a sole liner having a forepart and a heel part, stitching marginally securing said upper forepart to said sole liner forepart, the heel part of said upper being unattached at its lower edge to the sole liner, a counter liner disposed

within the heel part of said upper, stitching securing the top margin of said counter liner to said upper and the bottom margin of said counter liner to the heel part of said sole liner, a relatively rigid counter disposed between said counter liner and the heel part of said upper, said counter having an integral flange underlying the heel part of said sole liner.

19. In a shoe, an upper, a sole liner, a counter liner, stitching securing the forepart of said upper to the forepart of said sole liner, stitching securing rear part of said sole liner to the bottom margin of said counter liner, the rear part of said sole liner being unattached to the rear part of said upper, a counter disposed between said counter liner and said upper, said counter having an integral flange extending beyond the stitched junction of said liners and below said sole liner, a platform member underlying said sole liner, an outsole and a heel structure underlying said platform member, and platform cover strips extending around the edge of said platform, said cover strips extending along the entire lower margin of said upper and being stitched thereto.

20. A method of making platform shoes, comprising the fabrication of an upper assembly off the last by stitching the margins of an upper and a platform casing together around the bottom of the upper and to a flexible insole forwardly of the heel portion thereof, connecting the top of a counter lining to the upper and stitching the bottom of said lining to the margin of said insole only at the heel portion thereof, thereby to provide a pocket for receiving a molded counter insertable between the stitched-together upper and casing and the stitched-together counter lining and insole.

21. A method of making platform shoes, comprising the fabrication of an upper assembly off the last by stitching the margins of an upper and a platform casing together around the bottom of the upper and to a flexible insole forwardly of the heel portion thereof, connecting the top of

a counter lining to the upper and stitching the bottom of said lining to the margin of said insole only at the heel portion thereof, thereby to provide a pocket for receiving a molded counter insertable between the stitched-together upper and casing and the stitched-together counter lining and insole, inserting in said pocket a molded counter having an intumed bottom flange, placing the upper assembly on a last and applying sole parts to the bottom thereof.

22. A method of making platform shoes, comprising the fabrication of an upper assembly by stitching the margins of an upper and a platform casing together around the peripheries thereof and to a flexible insole forwardly of the heel portion thereof, securing the top and sides of a counter lining to said upper at the rear thereof and stitching the bottom of said lining to the margin of the insole only at the heel portion thereof, to provide a counter receiving pocket, providing a molded counter having an intumed bottom flange, inserting the molded counter in said pocket, and then applying a platform and sole parts to the bottom of the upper assembly.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
513,368	Richardson	Jan. 23, 1894
1,687,529	Valentine	Oct. 16, 1928
2,071,725	Bickford	Feb. 23, 1937
2,339,726	Stritter	Jan. 18, 1944
2,341,675	Walsh	Feb. 15, 1944
2,341,676	Walsh	Feb. 15, 1944

FOREIGN PATENTS

Number	Country	Date
259,515	Great Britain	Oct. 14, 1926