Dec. 6, 1960 J. DE LORENZO 2,962,734

APPARATUS FOR MAKING SHOES

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FIG. 1.

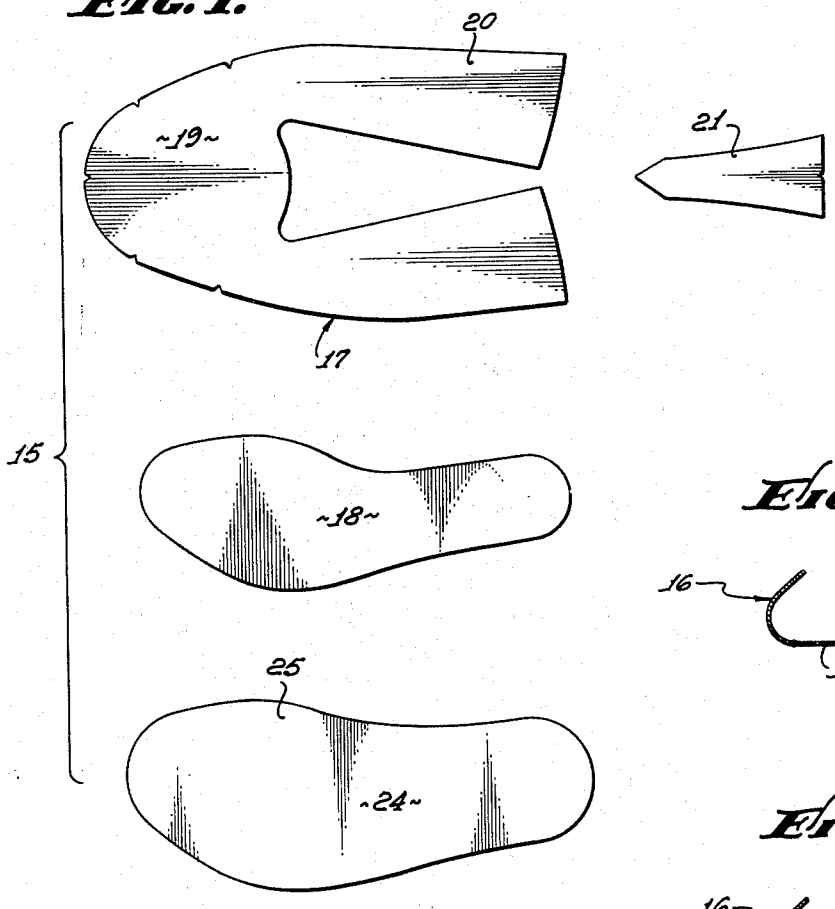


FIG. 4.

FIG. 5.

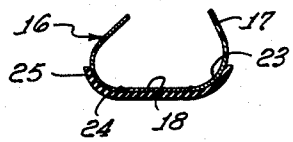


FIG. 2.

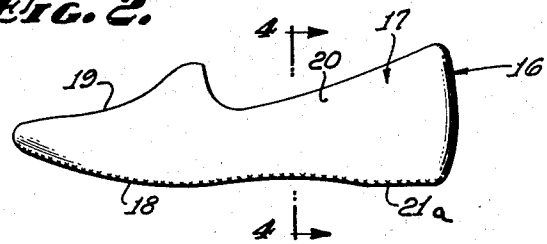
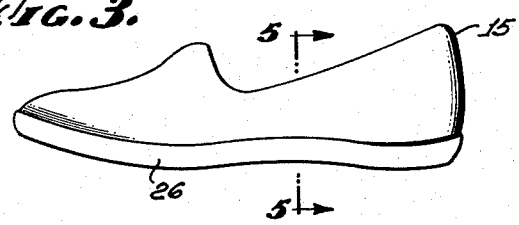


FIG. 3.



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FIG. 6.

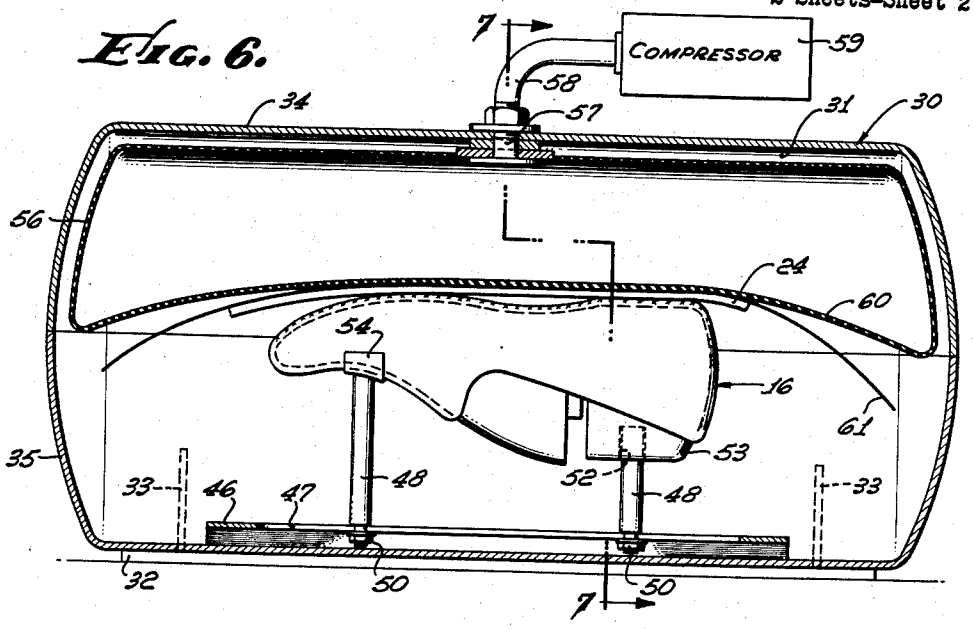


FIG. 7.

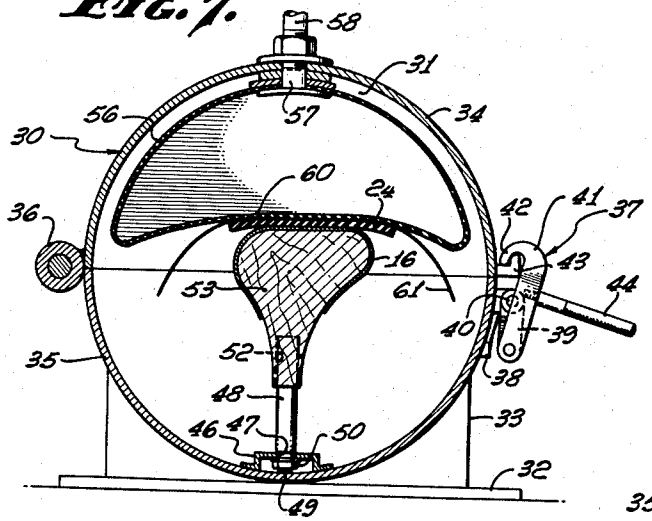


FIG. 8.

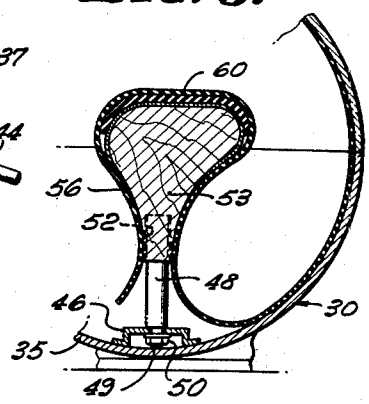
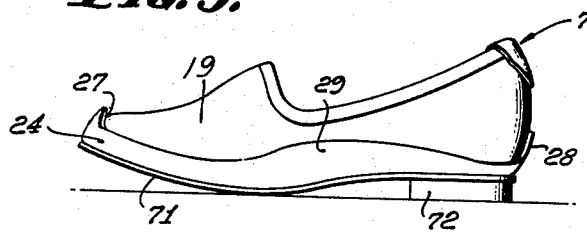


FIG. 9.



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United States Patent Office 2,962,734 Patented Dec. 6, 1960

2,962,734

APPARATUS FOR MAKING SHOES

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Filed Aug. 20, 1956, Ser. No. 605,091

2 Claims. (Cl. 12—1)

This invention relates to novel apparatus for making shoes. More particularly, this invention relates to a novel apparatus for attaching a precut outsole blank to side surfaces of a shoe sock which includes a shoe upper and a shoe insole.

Prior methods and machinery for making shoes have been extremely complicated, complex and very expensive. Innumerable, completely distinct shoe making operations have resulted in a multitude of shoe machines varying in design, performance and type. An important characteristic of the prior methods is that bottom edges of a shoe upper are turned inwardly as by tucking and drawing in of such bottom edges over the edge of a last. Filler material is placed between the turned in edges of the shoe upper. A sole is then pressed against the inturned edges and filler, the direction of pressure forces applied to the sole being against the bottom face of the last. Several distinct complicated operations were required to tuck in, secure, fill, press a sole against the filler and tucked in edges of the shoe upper and then secure the sole as by external stitching.

The present invention obviates the complicated process mentioned above and contemplates a simple, direct, inexpensive, novel apparatus for making shoes. The shoe made on the apparatus of this invention embodies a shoe construction in which the outsole imparts new styling and attractive appearance not possible with prior methods of making shoes and which will cling and hug a foot to afford greater comfort and support.

Generally speaking, the shoe made by the apparatus of this invention includes a shoe sock comprising a shoe upper and a shoe insole. The shoe upper and insole may be made in well known manner and may be stitched together along the last edge. Attached to external side surfaces of the shoe upper and spaced above the stitching is a precut outsole blank. The blank is formed of a single integral piece of leather, plastic, rubber composition or any other suitable material for a sole. The peripheral portions of the outsole blank are pressure wiped against and are secured as by adhesive or cement to the lower side margins of the shoe upper of the shoe sock. Thus, it will be seen that virtually the only stitching is that interconnecting the upper and the insole and that such stitching is protected by the over-lapping and over-lying of the peripheral portion of the outsole.

The apparatus contemplated by this invention includes essentially a housing provided with a pressure chamber within which may be adjustably positioned and supported a male form or shoe last. Positioned opposite to the shoe last is a resilient, flexible, rubber pressure bladder or bag which is connected by well known means to an air compressor. The resilient bag is of a size so as to normally lie in spaced relation to the shoe last. When the bag is inflated the walls of the bag virtually completely enclose and envelop the shoe last and in so doing a wall portion of the bag is pressed downwardly and sidewardly to wipe against the sides and surfaces of the shoe last or of a shoe sock ensleeved over the last. This pressing

and wiping action of the pressure bag is utilized to press and wipe simultaneously a precut outsole blank against the shoe sock and side margins of the shoe upper and also to simultaneously attach, by a suitable adhesive bonding agent, the outsole blank to the shoe sock at a continuous zone at the side thereof and spaced above the bottom portion of the sole. The housing is provided with means to adjustably support the shoe last so that lasts of different size and configuration may be used in the housing.

The primary object of this invention therefore is to disclose and provide a novel apparatus for making an article having a bottom portion and upstanding side portions, such as a shoe.

An object of the invention is to disclose and provide a novel apparatus for attaching an outsole to a shoe sock.

An object of this invention is to disclose and provide a novel apparatus for making a shoe construction in which a minimum of stitching may be used and in which the stitching connecting a shoe insole and a shoe upper is covered and protected by an outsole.

A still further object of this invention is to disclose and provide an apparatus for attaching an outsole to a shoe construction wherein a precut outsole blank of suitable material is simultaneously pressure wiped and attached to sides of shoe upper under uniform pressure so that the outsole assumes and acquires a desired shape in accordance with the shape of the last.

Still another object of this invention is to disclose and provide an apparatus for making shoes wherein a resilient, compliable, pressure bag is employed to apply variably directed pressure forces against an outsole blank to shape said blank against a last and at the same time to secure said blank to a shoe sock which may be carried by the last.

Various other objects and advantages of this invention will be readily apparent from the following description of the drawings in which an exemplary embodiment of this invention is shown.

In the drawings:

Fig. 1 is an exploded plan view of parts, including shoe upper, shoe insole, and shoe outsole, of a novel shoe embodying this invention.

Fig. 2 is a side view of a shoe sock made from the shoe upper and insole shown in Fig. 1.

Fig. 3 is a side view of a shoe including the parts shown in Fig. 1.

Fig. 4 is a transverse sectional view through a shoe sock, the section being taken in the plane indicated by line IV—IV of Fig. 2.

Fig. 5 is a transverse section through the shoe construction shown in Fig. 3, the section being taken in the plane indicated by line V—V of Fig. 3.

Fig. 6 is a sectional view of an apparatus embodying this invention for attaching an outsole to a shoe sock, the section being taken in a longitudinal plane bisecting the apparatus.

Fig. 7 is a transverse sectional view of the apparatus shown in Fig. 6, the section being taken in the transverse vertical planes indicated by lines VII—VII of Fig. 6.

Fig. 8 is a fragmentary transverse sectional view of a shoe last and of a pressure bag showing how the pressure bag encloses the shoe last under pressure.

Fig. 9 is an elevational view of a modified shoe construction embodying this invention in which a second outsole and heel has been attached to the shoe of Fig. 3.

For purposes of clarity reference will first be made to Figs. 1 to 5 inclusive which show a shoe construction and made by the apparatus of this invention. It will be understood by those skilled in the art that any suitable material may be used in such a shoe including leather,

canvas, plastic materials such as neolite, rubber compositions and the like.

A shoe embodying this invention is generally indicated at **15** in Fig. 3 and comprises a shoe sock **16** which includes a shoe upper **17** and a shoe insole **18**. The shoe upper may be cut to any selected shape and pattern as indicated at the top of Fig. 1 and may include an upper vamp portion **19** and side portions **20** connected together by a heel portion **21** stitched thereto in well known manner. The upper **17** may be made out of one precut blank of material and sewed only along the heel line if desired, or it may be made of several pieces of material stitched together to provide a desired style and appearance.

The shoe sock **16** includes insole **18** which may be made of any suitable material, in this example, canvas or a suitable light weight fabric. The insole **18** may be precut to a selected shape and size and generally conforms to the bottom face of a selected last. It is understood that the last may be of any shape and form and of a construction commonly used in the shoe industry.

The shoe sock **16** may be formed by first sewing the shoe upper together so that pieces **20** and heel portion **21** are connected by stitching and then by sewing insole **18** to the lower side margins **20** of the shoe upper along the bottom edges thereof at a line of stitching indicated at **21***a*. There is thus formed the shoe sock **16** which may be readily ensleeved over and positioned on a last of corresponding selected form.

Secured to external surfaces of the shoe sock **16** by adhesive or cement at **23** may be an outer sole **24**, said outer sole being formed from a precut outsole blank of selected shape and configuration. The outsole blank is substantially larger in area than insole **18** and is provided with a peripheral portion **25** which overlies external surfaces of the lower margins **20** of shoe upper **17**. The peripheral portion **25** also protectively covers line of stitching **21***a*. In exemplary shoe **15** it will be noted that the peripheral portions **25** of outsole **24** extend along the side of the upper to provide an outsole band **26** of relatively uniform width.

It will be understood that outsole band **26** may be of selected configuration and shape and may include a rearwardly directed toe portion **27** (Fig. 9) which extends onto the upper vamp portion **19** and also with a rising heel portion **28** which extends upwardly along the heel of the shoe sock. In some instances it may be desirable to widen the instep portion of the outso'e blank so that an upwardly curved instep outsole portion **29** is provided for support of an instep. When the outsole blank is made of a wear resistant material, such as the harder leathers and neolite, the instep portion **29** is relatively stiff and supports the arch of a foot in exceptional manner.

The outsole **24** may be made of any suitable selected material such as a soft or hard leather, a rubber composition, neolite and the like. The thickness of the outsole **24** may be uniform throughout its length and width as indicated in the drawings or it may be of variant selected section. While the exemplary shoe shown in Fig. 3 is of slipper type having a uniform section outsole the bottom surface of the outsole **24** may be configured to provide an integral heel portion.

In Fig. 9, the modified shoe construction **70** has been partially described above and includes the shoe construction described in Fig. 3 having attached thereto in well known manner as by cementing or nailing a second outsole **71** and a heel **72** in order to provide a different style of shoe. In the shoe **70**, the outsole **24** may be of either soft or relatively stiff material depending upon the type of shoe desired.

It is understood that many variations may be made in the style of the shoe in which the outso'e **24** covers in a selected pattern surface portions of the shoe upper and in each instance the outsole covers the stitching **21***a*, extends onto and is secured to the shoe upper along a continuous side zone having spaced relation to the bottom of the shoe. The exterior or bottom surface of the outsole **24** is continuous and unbroken and thereby affords unusual wear and weatherproof characteristics. Since the outsole **24** conforms to the shape of the last and may be made of selected softness or hardness, a novel shoe construction is provided in which the shoe may be made to smoothly fit and follow contours of a foot.

In Figs. 6 to 8 inclusive is shown an apparatus embodying this invention for making a shoe such as described in Figs. 1 to 5, and 9. An exemplary apparatus of this invention includes a hollow housing, generally indicated at **30** of elongated cylindrical form and providing an elongated internal pressure chamber **31**. Housing **30** may be supported on a flat base plate **32** having longitudinally spaced saddles **33** for receiving the housing **30**. The saddles **33** may be welded to the housing and plate **32**. The housing **30** may comprise an upper generally semicylindrical housing portion **34** and a bottom mating semicylindrical housing portion **35**. Housing portions **34** and **35** may be connected by suitable hinge or pivot means **36** along one longitudinal edge. Opposite to hinge means **36**, housing portions **34** and **35** may be provided with a clamp means **37** for holding the portions securely together when the housing is under pressure.

The clamping means **37** may comprise a pair of longitudinally spaced brackets **38** secured to bottom housing portion **35**. Brackets **38** each carry a depending link **39** pivotally connected at its top end at **40** to the bracket and pivotally connected at its bottom end to a clamp member **41**. The clamp member **41** includes an inturned downwardly directed top hook portion **42** which cooperates in interlocked engagement with an upwardly directed lug **43** carried by upper housing portion **34**. The hook portion **42** and lug **43** have substantial length to clamp the two housing portions together along the middle portion of the housing. The clamp member **41** includes an outwardly directed handle **44** which may be readily grasped for manipulation of clamp means **37**. The pivotally connected links **39** may provide a toggle-locking action when the handle **44** is urged downwardly for securely clamping the housing portions in closed position.

The bottom housing portion **35** includes a longitudinally extending inverted channel member **46** secured as by welding to the bottom portion **35**. The channel member **46** is provided with a longitudinally extending slot **47** within which may be longitudinally slidably received the bottom ends of a pair of upstanding last positioning members or studs **48**. Each stud **48** has a threaded portion **49** at its bottom which engages a nut **50** positioned beneath the slot **47** and within channel member **46**. It will be readily apparent that studs **48** may be spaced apart at any selected distance by simply sliding the studs **48** toward or away from each other in the slot **47**. The studs **48** may be relatively freely movable in slot **47** for quick adjustment of the spacing thereof. One stud **48** may be relatively short and has an upper end adapted to be received within the thimble **52** usually provided in a commonly used shoe last **53**. The other stud **48** may be provided with a rest or saddle **54** for supporting the toe portion of last **53**. Since lasts are of different size and length it will be readily apparent that the longitudinally adjustably positionable studs **48** may accommodate such lasts as by varying the spacing of studs **48**.

Within the upper housing portion **34** may be carried and positioned an inflatable, expandable, resilient, compliant, pressure bladder or bag **56** of any suitable rubber, rubber composition or other material. Bag **56** is connected to housing portion **34** by a nipple **57** which provides an inlet to the interior of pressure bag **56**. Inlet nipple **57** may be connected to a suitable conduit **58** which is connected at its other end to an air compressor

59. Suitable valves (not shown) in the line 58 control the admission of air pressure to bag 56.

Pressure bag 56 extends longitudinally for substantially the entire length of pressure chamber 31 and may be of generally half cylindrical form having a downwardly directed bottom wall portion 60 disposed when deflated above last 53. Pressure bag 56 is of a size so as to expand downwardly along sides of the last to exert side pressure thereagainst and may virtually fill the space within the pressure chamber 31 when inflated. It will be understood that while pressure air is described, other pressure fluids may be employed to expand bag 56 if desired. When pressure bag 56 is expanded under suitable pressure such as 40 to 50 pounds per square inch, the bottom wall portion 60 may completely envelop and enclose last 53 and subject the last surfaces to uniform variantly directed pressure.

In a shoe made of the apparatus in accordance with this invention, it will be understood that a shoe upper 17 may be formed as by stitching portions 19, 20 and 21 together and then interconnecting the shoe insole 18 thereto by a line of stitching along the last edge as at 21*a*. The shoe sock 16 so formed by joining the shoe insole and upper together may then be sleeved over a last 53 for which the sock is configured. The last 53 may then be positioned and supported in the bottom housing portion 35 on the spaced studs 48, the thimble 52 in the heel portion of the last readily receiving the upper cylindrical portion of one stud 48 and the toe portion of the last being conveniently supported on rest 54 provided on the other stud 48.

The outsole blank 24 is then prepared by cutting to a selected shape or pattern and then applying a suitable adhesive or cement to the inner surfaces of the peripheral portion 25. Likewise, the external surfaces of the lower margins of the shoe upper may be coated with a suitable adhesive along the areas against which the peripheral portions 25 will contact, said areas being premarked and delineated by well known means such as chalk. The outsole 24 is then carefully positioned on the last bottom and over the insole 18.

If desired a thin compliant flexible cover 61 of material such as plastic may be positioned over the upwardly facing surface of outsole 24 in order to protect it against marring or discoloration caused by pressure contact of the bottom wall 60 of the pressure bag. The exterior surface of the bottom wall 60 may then be coated with any suitable lubricating material to avoid friction between the wall portion 60 and the cover 61 which might displace the outsole blank 24. The upper housing portion 34 may then be closed and secured by clamp means 37.

Pressure air is then introduced into the pressure bag 56. As the bag expands, the bottom wall portion 60 first contacts the upper surface of the cover sheet 61 on the outsole 24. As pressure increases the bottom wall portion 60 of the bag presses downwardly against the outsole 24 and holds the outsole in position. Wall portion 60 expands downwardly between the last and walls of the pressure chamber and smoothly progressively wipes the peripheral portion 25 of the outsole from the bottom of the last along the sides of the last. In a sense, the outsole is caused to wrap itself along sides of the last and the adhesively coated surfaces of the outsole and shoe upper are brought into pressure engagement. The fluid pressure exerts a sidewardly directed force against the last and the side surfaces of shoe sock. Since the pressure applied to outsole 24 is uniform throughout the area thereof, the outsole readily and smoothly conforms to the shape of the last 53. As the bag continues to expand, the bottom wall portion 60 may virtually envelop and wrap itself about the last 53 and the shoe sock thereon. Thus the upwardly directed edge of peripheral portion 25 is pressure held by sidewardly directed uniform forces in tight sealing relation against the shoe upper entirely around the shoe and in smooth conformity with the shoe upper. The expanded bag may fill all the space of the pressure chamber in order to envelop the toe portion of the last to provide upwardly directed pressure forces acting against and securing a toe portion such as 27 (Fig. 9).

After pressure has been maintained for from 3 to 5 minutes, depending upon the material of the outsole 24 and the kind of cementing or adhesive agent employed, the pressure may be relieved, the pressure bag deflated, and housing 34 opened. The last containing the completed shoe may be easily lifted off of the supporting studs 48 and the last collapsed so as to withdraw the last from the shoe.

It will be readily apparent that the outsole 24 has its peripheral portions 25 smoothly and evenly attached to side surfaces of the shoe upper along an attachment zone which lies in spaced relation to and above the line of stitching 21*a*, and that said outsole protectively covers the line of stitching 21*a* between the insole and the shoe upper. The shoe 15 as thus constructed may be a completed shoe. It is important to note that the attachment zone of outsole to the shoe upper is in a distinctly different area than that of prior proposed shoes and is possible because of the use of a male form or last and the compliant shapeable pressure applying bag contained and restrained in a pressure chamber. The application of such pressure against a last to attach an outsole to sides of a shoe upper in such a new attachment zone permits construction of new creative shoe styles in an inexpensive manner and without complex numerous shoe making operations.

It is understood that if outsole 24 be made of relatively hard, stiff leather, the outsole 24 may be first softened and made relatively pliable before placing it on the shoe sock by well known means. Likewise, an outsole 24 of plastic or rubber composition material such as neolite may be made relatively flexible and pliable as by preheating the neolite to a selected temperature. Thus when uniform pressure is applied by pressure bag 56 to the exterior surfaces of outsole 24, the outsole readily smoothly conforms to the shape of the last and simultaneously is secured and attached to the shoe upper by pressing together the adhesive applied to the outsole and the shoe upper.

Various modifications and changes may be made in the exemplary apparatus of the invention which fall within the spirit of this invention, and all such modifications and changes coming within the scope of the appended claims are embraced thereby.

I claim:

1. In an apparatus for attaching a precut shoe sole blank to a sock carried by a male form, the combination of: an elongated cylindrical housing having internal cylindrical faces and internal end wall faces defining a chamber; means on said cylindrical faces within said chamber to support the male form with a sole-supporting surface adjacent the axis of the housing; a flexible resilient pressure bag means in said chamber and having normally convex top end and side walls spaced from said internal faces and a bottom lateral and longitudinal concave wall above and adjacent said sole support surface; and a single support connection means for said bag interconnecting the top wall of the bag to the housing, said single support means including an air passageway to the interior of the bag for introduction of pressure fluid into said bag to produce expansion thereof against said internal faces and said male form whereby the bottom wall of the bag is adapted to pressure wipe in a smooth progressive manner a blank positioned on said sole-supporting surface, said bag means virtually enveloping the male form.

2. In an apparatus for attaching a precut shoe sole blank to a sock carried by a male form, the combination of: an elongated housing having internal cylindrical faces and internal end wall faces defining a chamber; means

within the chamber to support the male form with a sole-supporting surface centrally of the chamber; a flexible resilient pressure bag means in said chamber and having top, end, and side wall portions spaced from and generally corresponding in curvature to opposed portions of said cylindrical faces and end wall faces, said bag means having a bottom wall portion above and adjacent the sole-supporting surface and extending outwardly of said sole-supporting surface; and a single support means for holding the bag means, said support means including a passageway to the interior of the bag for introduction of pressure fluid into said bag means to produce expansion thereof against said internal faces and said sole-supporting surface and male form whereby the bottom wall portion of the bag means is adapted to pressure wipe in a smooth progressive manner a blank positioned on said sole-supporting surface.

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