

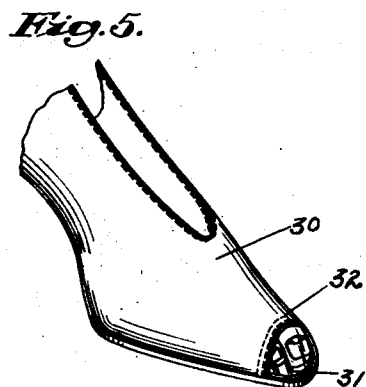
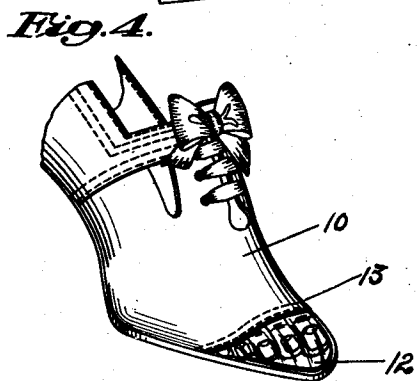
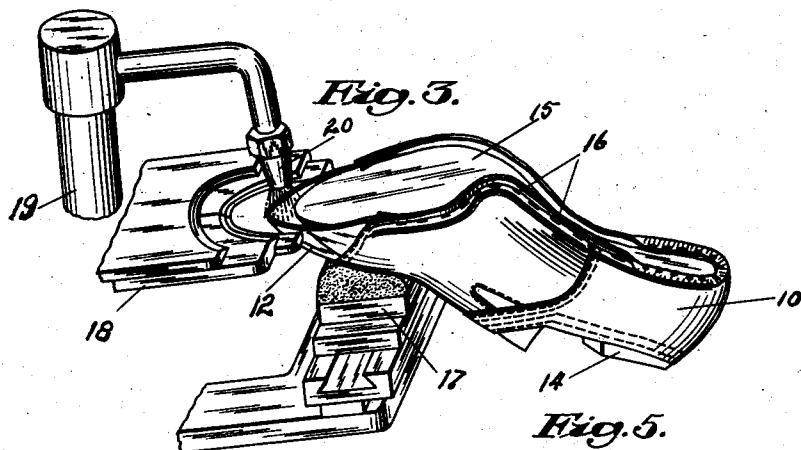
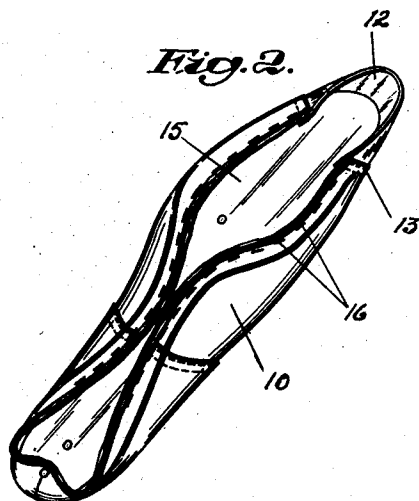
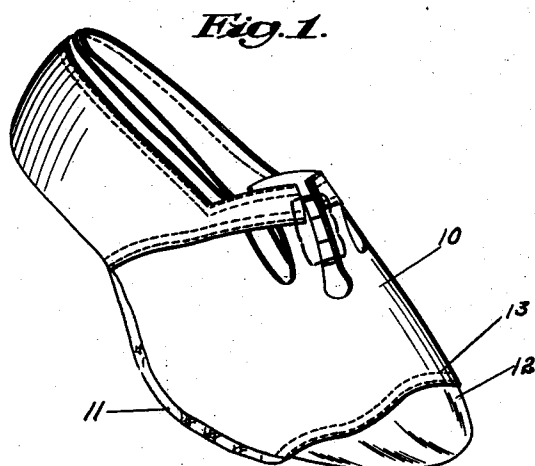
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SHOEMAKING

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SHOEMAKING

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This invention consists in a novel process of incorporating in shoes transparent stiffeners, particularly box toes and counters which are adapted to be exposed in a restricted open area in one end of the shoe, thus having the double function of the usual stiffener as well as the function of a transparent closure for what would otherwise be an aperture in the upper.

The generally accepted practice of incorporating into the shoe, concealed between the outer integument and the lining, a conformable stiffener blank has been to some extent outmoded. By the present style trend, holes or open apertures are frequently left at toe or heel ends of the upper. Such shoes are uneconomic as great wear comes on the stockings of the wearer and frequent raveling of the knit goods occurs as "runs." Such open toes in particular cause great discomfort as small pebbles, stones and dirt lodge in the shoe under the foot to cause bruises and the like and in wet weather the wearer has the discomfort of damp feet. Finally a shoe so made lacks structural support due to the absence of forepart or rearpart stiffening and in consequence the shoe is distorted and misshapen after a minimum of service.

I have discovered that the style advantages of the open vogue may be retained and the many disadvantages heretofore unavoidable associated with apertured uppers may be overcome by employing a novel transparent or translucent unit forepart or rearpart stiffener in a manner hereinafter set forth.

In carrying out my invention I select a transparent or translucent chemically stable sheet plastic material that has the characteristics of toughness and strength both in plastic form and when hardened in the upper and which is pliable and not brittle when cold. In other words, the plastic material must be a material suitable for box toes or counters and in addition is preferably transparent. The upper having been first fashioned with its outer integument and lining, if any, cut away to define a restricted open area either in the toe or heel portion, or in both, I may proceed to stitch or cement the flat plastic blank into the upper in such a manner that the blank is fully exposed in the cut out open areas. By restricted area I mean an area not greater than the whole tip or not greater than the counter area of the shoe. In either case the line of stitching will pass through the outer integument of the upper, the lining and the edge of the plastic blank itself and extend about the margin of what would otherwise be an aperture in the upper.

While I may employ any one of several sheet plastic materials having the requisite qualifications, I prefer to use acetate of cellulose because of its lower softening point, lower price and ready availability not only in the form of transparent sheeting but also in the wide range of translucent colors. Ethyl cellulose, polymers of vinyl acetate or conjoint polymers of vinyl acetate and vinyl chloride, n butyl methacrylate, polystyrene and various analogous or derivative products may be successfully employed since they also have the essential characteristics already discussed. A further and very important qualification of all these materials is that they have no tendency to cause dermatitis by being worn next the skin.

The upper containing my plastic sheeting is next assembled on the last, the innersole being in place and the whole is subjected to the pulling over operation. In dealing with the toe end of the upper and since the transparent blank is stiff and resilient or substantially so, at this point in the process of shoemaking I prefer to obtain my lengthwise draught of the upper to the last by closing and advancing only the forward side-pincers leaving the extreme front pincer disengaged.

The shoe is then sidelasted and so made ready for the bed-lasting operations. I have found it possible to render my plastic blanks sufficiently soft and conformable for lasting by employing solvent—one such being 30% water, 10% ethylacetate, 10% butyl acetate, 40% ethyl alcohol. Such a procedure is inconvenient and difficult to apply with the shoe in situ in the lasting machine, the upper leather or fabric may be stained and the time of softening is indefinite and slow. Finally, the result is less than desirable since solvents recreate any knife scorings or plate marks in the stock and "blush" or cloud the finished toe or counter with discouraging and unpredictable irregularity. Steam is likewise objectionable as a softening means. Many of the plastics becloud after steam treatment and most of them have a water absorption of two to eight percent.

Perhaps most baffling of all as a factor in this problem is the extremely quick dissipation of heat inherent in these plastic materials. Thus when normal heating is employed, as by heating the blank on a separate heater, it cools almost instantaneously. Before the shoe operator can complete his work, the toe or counter has hardened and set in half-lasted condition. Then any attempt to complete the wiping-in breaks, creases or distorts the stiffener. This low specific heat, or more properly this inability to retain thermo-

plastic temperatures long enough to complete the shoemaking operation, has been a heretofore insurmountable difficulty. Heated wipers are inadequate because they do not heat the entire area of the blank that must be rendered plastic to conform it to the toe of the last.

I have solved this problem by maintaining at the toe or heel-seat positions, when the shoe is spindled in the bed lasting or heel-seat lasting machines, a controlled blast of hot air. While the temperature of the air may be varied to meet the softening points of the particular plastic employed, I find that around 300° F. is a safe, operable temperature. Safe because substantially higher temperatures will cause the plastic to blister or otherwise become damaged and operable because the air blast directed at and around the stiffener that it is desired to conform to the last will maintain the blank sufficiently soft to be readily heel-seated or bed-lasted.

Preferably my softening means is a controlled jet of hot air either coming from a pipeline that is imposed over the inverted spindled shoe and thus plays directly upon the plastic blank to be softened, or one that is directed from beneath and thus glances off the face of the plastic blank later to become the external surface of the shoe upper, or both. The pipeline may for convenience have a nozzle which is hinged to allow unobstructed entrance of the shoe to the machine and may be conveniently displaced to a dwell position between softening operations. Also it is obvious that the air blast may be foot controlled, manually controlled or actuated by any desired moving part of the bed lasting or heel seating machine.

It should be pointed out that one reason for the commercial success of my invention is the fact that I am able to employ higher temperatures than are safe or practical to use where leather is to be directly treated. For example, it is customary to safe-guard leather, even of chrome tannages, against dry heat much above 130° F., not only because leather is a chemically preserved animal tissue and highly sensitive to elevated temperatures, but because leather always contains a fat liquor of "stuffing" which endows it with much of its flexibility. Since this fat liquor is readily sweated out, dry heat at the temperature I employ would normally be inhibited from employment and not even contemplated where leather is concerned. In dealing with my improved shoe stiffener, however, no leather is actually involved as the hot air impinges on the surface of the plastic blank and thus temperatures may be employed that might well ruin leather.

By control and direction of the heat utilized, either as a hot air flow or as radiant heat, I maintain the blank at lastable plasticity and thus overcome the hitherto insurmountable loss of heat and opportunity for conformability.

These and other features of the invention will be best understood and appreciated from the following description of an illustrative example of the manner in which the process may be carried out as shown in the accompanying drawing, in which,

Fig. 1 is a view in perspective of an upper ready for lasting,

Fig. 2 is a view in perspective of the upper in side lasted condition upon a last,

Fig. 3 is a view in perspective illustrative of the toe lasting step of the process,

Fig. 4 is a fragmentary view in perspective of the finished shoe, and

Fig. 5 is a similar view of a pump lasted in accordance with the process of the invention.

In carrying out my invention the upper is prepared by assembling the outer integument 10 which may be of woven, felted or tanned material, all hereinafter referred to as the fabric portion of the upper, together with the lining 11, and the forepart unit stiffener 12. The fabric portion of the upper is cut away in this instance to provide a restricted open area at the tip and the full outline of the vamp is completed by a transparent blank 12 of cellulose acetate which at its rear edge is inserted between the outer integument 10 and the lining 11 and is stitched in place by a double row of stitching 13 extending through the rear edge of the blank 12 and both fabric portions of the upper.

The upper prepared as shown in Fig. 1 may now be assembled upon a last 14, pulled over, omitting the draft of the front pinchers, and staple side lasted to the insole 15 by staples 16 in the usual manner. In this operation the transparent stiffener blank 12 will be transversely bowed to the last but will project beyond the tip thereof as shown in Fig. 2. The side lasted upper is now ready for toe lasting and this step may be carried out by hand or by any suitable machine after the stiffener 12 has been rendered fully soft and plastic. As suggested in Fig. 3 the lasted upper may be placed in any commercial bed lasting machine with its forepart resting upon the toe pad 17 and its toe portion properly positioned for the action of the wipers 18. As herein shown the machine is provided with a vertical standard 19 supporting a downwardly turned nozzle 20 upon a lateral arm. The standard 19 and nozzle 20 are arranged to deliver a continuous blast of hot air at a carefully regulated temperature directed against the inner concave face of the unit stiffener 12. As already explained air maintained at approximately 300° F. is effective in a short time to render the cellulose acetate stiffener soft and pliable. When this condition has been reached the toe wipers 18 are advanced in the usual manner and the toe lasting of the upper is completed. This may be done simultaneously with the delivery of the hot air blast, or the nozzle 20 may be swung to one side and the wipers advanced without delay. It will be noted that the nozzle 20 is directed so that the hot air blast effectively reaches the entire area of the unit stiffener 12, thus rendering the latter completely pliable and obviating the occurrence of wrinkles in the lasted stiffener.

It will be noted also that the stiffener 12 is of sufficient strength and toughness in its softened condition so that it may be treated in the lasting operation as an integral part of the upper transmitting the lasting stress effectively and so facilitating the lasting operation.

Upon removal of the hot air blast the lasted stiffener 12 hardens immediately at room temperature into a stiff resilient transparent or translucent form accurately reproducing the shape of the last and completing the enclosure of the upper at the tip end of the shoe. The completely lasted upper may now be removed from the lasting machine and the shoe finished in the regular routine of manufacture.

The forepart of the finished shoe is shown in Fig. 4 from which it will be apparent that the restricted opening in the fabric portion of the upper is filled out by the transparent tip 12

through which the toes of the wearer are clearly visible although they are fully protected. I refer to the stiffener 12 as a unit forepart stiffener because it provides in unit structure the stiffener which has formerly been built into the shoe by combining a stiffener blank with the outer integument of the upper and with the lining if a lining is used.

In Fig. 5 I have illustrated my invention as embodied in a pump having a full vamp 30 cut away at the tip in a U-shaped opening, this opening being closed by a transparent window 31 secured in place by the stitching 32 about its margin, closing the opening in the fabric portion of the vamp and stiffening the forepart of the shoe as already explained.

While several transparent or translucent plastic materials are available in sheet form of suitable thickness and texture, for example 0.020 to 0.030" in thickness, not all of these have the qualifications necessary for carrying out my invention. Some are unstable chemically and will burn fiercely when heated above a moderate temperature. These, of course, are out of the question. Others are brittle when cool and so are not satisfactory in ordinary wear, while still others cause dermatitis when worn next to the skin. The plastic materials enumerated above, however, are all free of these objections, and for the reason explained, only such equivalent materials are used in carrying out the present invention. All of these materials, moreover, result in a stiff but resilient, self-sustained formed unit, reproducing accurately the shape of the last and imparting to the forepart or to the rear part as the case may be the shape-retaining properties heretofore furnished by concealed box toe or counter stiffeners.

Having thus disclosed my invention I claim as new and desire to secure by Letters Patent:

1. The process of making shoes which consists in stitching into the upper a tip blank of tough translucent resilient thermoplastic sheet material in such a manner that the blank is fully exposed on both sides in an area in advance of the tip line, side lasting the upper and thereby transversely bowing the tip blank, and then subjecting the bowed blank to a blast of hot dry air and simultaneously lasting it to form a completely closed upper with a transparent window in the bowed portion of the shoe.

2. The process of shoemaking which includes the steps of providing an upper with a tough translucent tip of stiff resilient cellulose acetate or the like in sheet form which projects in fully exposed condition in an area in advance of the tip line, side lasting the upper in such a manner as to deliberately bow the tip transversely, delivering a blast of hot air against the concave inner face of the top thereby rendering it plastic throughout, and then toe lasting the plastic tip.

3. The process of shoemaking which includes the steps of fastening to a last the sides of an upper which has a bare tip of stiff resilient cellulose acetate or the like fully exposed in an area within the outline of the upper and projecting in bowed condition beyond the end of the last, softening the entire tip by a blast of hot dry air, and toe lasting the softened tip.

4. The process of shoemaking which includes the steps of partially shaping to a last the sides of an upper which has a bare blank of stiff resilient cellulose acetate or the like stitched about its margins into one end of the upper and fully exposed in an area within the outline thereof, softening the entire blank by a current of hot dry air, and end lasting the softened blank.

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