March 2, 1937. W. H. BAIN 2,072,727

INSOLE AND PROCESS OF MAKING THE SAME

Filed Sept. 11, 1935

Fig. 1.

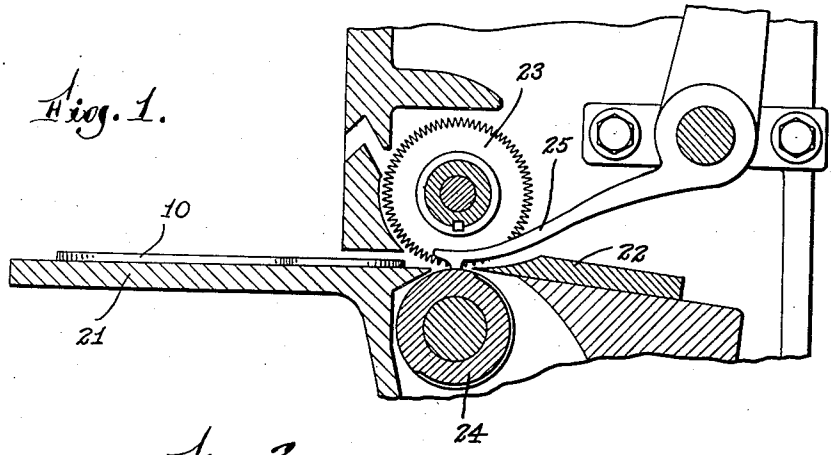


Fig. 2.

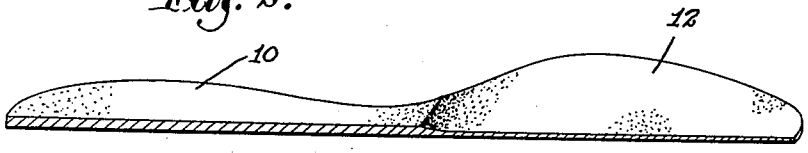


Fig. 3.

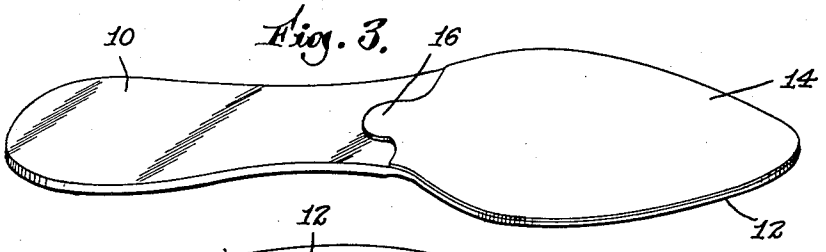


Fig. 4.

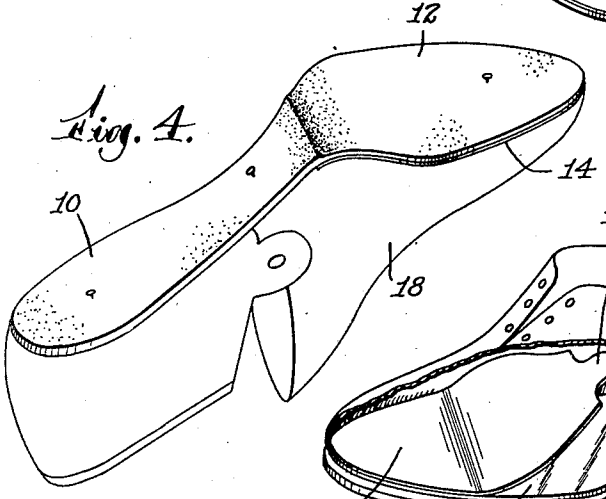
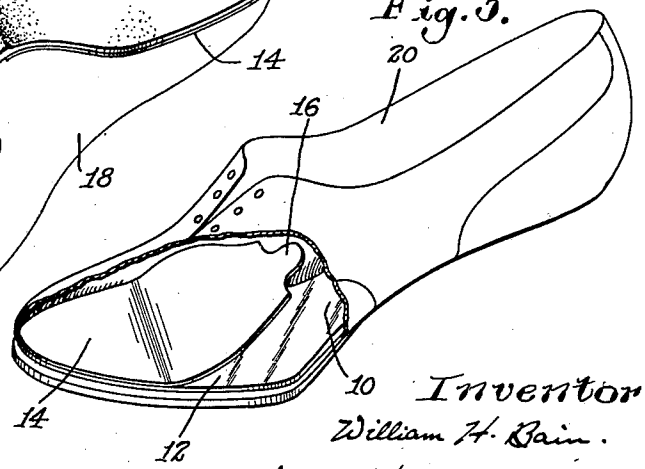


Fig. 5.



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INSOLE AND PROCESS OF MAKING THE SAME

William Henry Bain, Lewiston, Maine

Application September 11, 1935, Serial No. 40,067

5 Claims. (Cl. 36—44)

This invention consists in an improved insole for use in the manufacture of women's shoes. The invention includes within its scope a novel process of making such soles by steps which may be carried out conveniently under conditions of commercial manufacture and without requiring particular shoe making skill.

In the manufacture of fine shoes for women's wear there is an insistent demand for an extremely flexible light weight bottom and a no less insistent demand that the fine lines of the last and close edge effect in the shank and forepart shall be maintained in the finished shoe. These two requirements are antagonistic in a measure because an insole of the desired flexibility and lightness has not the strength to withstand the severe strains of tight lasting without being distorted. I have discovered however, that it is practical to reinforce the insole temporarily and during the shoe making process by securing thereto an inextensible sheet, as of fibre of high tensile strength, which may remain in place during the lasting operation, and which will carry the strain incident to a tightly lasted upper and which finally may be removed from the inside of the shoe after the last has been pulled.

The present invention contemplates the employment of an integral full-length blank having the contour of the complete sole and having a smooth unbroken inner face, and by "inner face" I mean the face of the insole which is placed next to the last bottom in making the shoe, and which lies under the wearer's foot in the finished shoe. This blank is skived to reduce the entire area of its forepart and to form a zone of gradual increasing thickness at the forward end of the shank or behind the ball line. This, it is believed, is a skiving operation which has not heretofore been carried out in connection with insole blanks and it makes possible the improved reinforced insole of my invention. One manner of carrying it out is in connection with a matrix roll skiving or splitting machine organized to remove a skiving of substantially uniform thickness from the entire forepart of the sole terminating in a bevelled portion running out into the outer face of the blank. Having prepared the blank in this manner, a reinforcing sheet of flexible but inextensible fibre is temporarily secured to the smooth inner face of the blank by cement of limited adhesive power. The reinforced insole may then be tacked to the last bottom and the shoe-making process may then be carried out with all assurance that no distortion of the insole will occur resulting in releasing of the lasted upper detracting from fine lasting. This is because every part of the flexible insole blank is supported in continuous face to face engagement by the inextensible fibre reinforcement. The lasting operation, the subsequent shoe making operations, such as levelling, and the drying out of the shoe on the last, all of which impart strains to the insole, may then be carried out without special consideration to the insole. At the conclusion of the shoe making process, when the last has been pulled from the finished shoe, the reinforcing sheet may be readily stripped from the smooth inner face of the insole, thus presenting a shoe bottom of beautiful appearance and of extreme lightness and flexibility, and one in which the fine lines of the last have been meticulously preserved.

This and other features of the invention will be best understood and appreciated from the following description of a preferred embodiment thereof and of one manner in which the insole may be advantageously prepared.

In the drawing,—

Fig. 1 is a sectional view of a matrix roll skiving machine adapted for carrying out the special skiving operation required.

Fig. 2 is a view in perspective, partly in section, showing the skived insole blank as it comes from the machine of Fig. 1,

Fig. 3 is a perspective view of the complete reinforced insole,

Fig. 4 is a view in perspective illustrating the application of the reinforced insole to the last bottom, and

Fig. 5 is a view in perspective with part broken away illustrating operation of stripping the reinforcing sheet from the inner face of the insole in the finished shoe.

The basis of my improved insole, as shown in Fig. 2 is a blank of flexible leather or composition having the contour of the complete shoe bottom and being reduced in thickness throughout its forepart 12. The entire forepart is preferably reduced to a uniform thickness, the blank tapering gradually at the forward end of the shank to full thickness in its shank and rear portion 10. In reducing the forepart I prefer to remove a skiving from the outer face of the blank leaving the inner, or lower face as seen in Fig. 2, smooth and uninterrupted. If the blank includes the grain of the leather this will be retained in the inner face of the blank and the skiving removed from the flesh side.

Having prepared the blank in the manner above explained, a reinforcing sheet 14 is cemented to the inner face of the blank in con-

tinuous, coextensive contact and coinciding in shape therewith about its margin. If desired the rear edge of the reinforcing sheet may have a projecting tab or tongue 16 to assist in removing the sheet after the lasting operation. The reinforcing sheet 14 may be of any pliable and inextensible material having sufficient tensile strength to withstand the lasting strains. A medium hard grade of fibre sheet is suitable for this purpose and may be readily dyed out to fit the contour of the forepart 12. The reinforcing sheet 14 may be temporarily secured to the blank by any cement which does not disfigure the face of the insole and which will permit the subsequent removal of the reinforcing sheet. A slow setting cement or a paste of not too powerful adhesive properties may be satisfactorily employed and since the area of contact is relatively great, a union is secured which is adequate for purposes of this invention.

Having prepared the reinforced insole as shown in Fig. 3, it may now be utilized in the shoe making processes as conveniently and with the same assurance as a heavy molded insole. As suggested in Fig. 4 the reinforced insole is tacked to the bottom of the last 18 with its inner reinforced face against the last bottom. The lasting operation is then carried out and in this the lasted margin of the upper 20 is drawn tightly over the edge of the last and the margin of the insole and secured in place by lasting tacks driven into the insole or into the last bottom. Eventually the lasted margin is united to the edge of the insole by cement or stitching and when the lasting tacks are removed the entire strain of the lasted upper devolves upon the insole. It is at this stage of the shoe making process that the insole as a whole must be inextensible and proof against stretching or distortion. The lasted shoe is allowed to dry out upon the last and during the drying operation, the strain upon the insole may be even more increased by the shrinking of the upper upon the last. However, at the conclusion of the drying operation, the upper material and all parts of the shoe are set in their final shape, the natural stretch having been substantially removed. Accordingly, when the last has been pulled, all external strains have been eliminated and there is no further necessity for great strength in the insole. Under these circumstances the reinforcing strip 14 may be stripped off the inner face of the insole 12 as suggested in Fig. 5 leaving the shoe with a very light flexible forepart and presenting within the shoe a smooth unblemished insole face, a characteristic highly prized in good shoe making and attractive to the wearer.

As already intimated the forepart 12 of the insole blank, may be reduced in a matrix roll machine in a novel skiving operation and this is suggested in Fig. 1 of the drawing which illustrates somewhat diagrammatically one type of skiving machine suitable for the purpose. The machine comprises a frame having an outwardly extending work table 21 and a stationary but adjustable skiving or splitting knife 22. Journalled in the upper part of the frame is a toothed feed roll 23 which may comprise yielding sections or which may be mounted in vertically yielding bearings, but which is at all times urged downwardly towards the matrix roll in a yielding manner. The matrix roll 24 is journalled in fixed bearings in the lower part of the machine frame and is herein shown as provided with a high portion of substantially the same length as the forepart of the blank to be treated and with the matrix cavity somewhat longer than the rear and shank portions of the blank. Flexible hold-down fingers 25 are arranged between the sections of the feed roll 23 and assist in pressing the stock into the cavity of the matrix roll.

In using such a machine as that suggested in Fig. 1 the insole blank is advanced by feeding mechanism operating in timed relation to the matrix roll thus introducing the toe end of the blank while the high portion of the matrix is in operative position, with the result that the sole is advanced in a lifted position to the knife 22, and a substantial skiving removed from its upper face. The skiving passes upwardly above the edge of the knife 22 and the skived sole blank passes downwardly beneath it. When the desired portion of the insole blank is reached, as for example, the end of the shank, the end of the matrix roll cavity comes into operative position allowing the insole blank to be gradually forced downwardly so that the splitting knife 22 rides out of the blank forming a bevelled zone extending to the point where the full thickness of the blank is received within the matrix roll and carried beneath the splitting knife 22.

It will be understood that while I have herein illustrated my invention as applied to an integral insole blank, it would not be outside the scope of the invention to apply separate or additional reinforcing means to the shank of the insole blank, or to modify its structure in any way so long as a smooth continuous inner face is maintained therein.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. The process of making reinforced insoles, which consists in skiving a sole blank to reduce it over the entire area of its forepart and to form a zone of gradually increasing thickness near its ball line, and temporarily cementing to the unskived face of said reduced forepart an inextensible sheet of relatively high tensile strength, coinciding substantially with the forepart of the sole in contour and extending a short distance over the unreduced part of the sole.

2. The process of making reinforced insoles, which consists in skiving an insole blank upon its outer surface to reduce it over the entire area of its forepart and to form a zone of gradually increasing thickness adjacent to its ball line, and temporarily attaching to the unskived face of the said reduced forepart a sheet of thin, inextensible material which terminates in the vicinity of the ball line and coincides in contour with the contour of the forepart of the insole.

3. A reinforced insole comprising an integral body having the contour of the complete sole and being of less thickness throughout its forepart and of greater flexibility than elsewhere, and an inextensible reinforcing sheet temporarily attached to the face of the thin forepart which is exposed inside the finished shoe, whereby it may be stripped from the insole after the lasting operation.

4. A reinforced insole comprising an integral body having a smooth, flat inner face, and an outer face with a bevelled zone therein, the insole being of less thickness throughout its forepart than elsewhere, and an inextensible reinforcing sheet coinciding in contour with the forepart of the insole and attached temporarily to its flat

inner face in position to take the strain of the lasting operation about the forepart of the shoe in which the insole is used.

5. A reinforced insole comprising an integral full-length body having a smooth flat inner face and an outer face with a bevelled zone therein, the insole being of less thickness and greater flexibility in advance of its ball line throughout the entire area of the forepart than elsewhere and too thin and flexible to withstand without distortion the strain of the lasting operation, and a thin fibre reinforcing sheet temporarily attached to the flat face of the thin forepart of the insole in coextensive relation therewith, and adapted to be lasted into the shoe with the insole and stripped therefrom after the removal of the last from the shoe.

WILLIAM HENRY BAIN.