May 24, 1932. L. P. MELLERIO 1,859,452

SHOE STIFFENER AND SHOE

Filed April 23, 1929

Fig. 1.

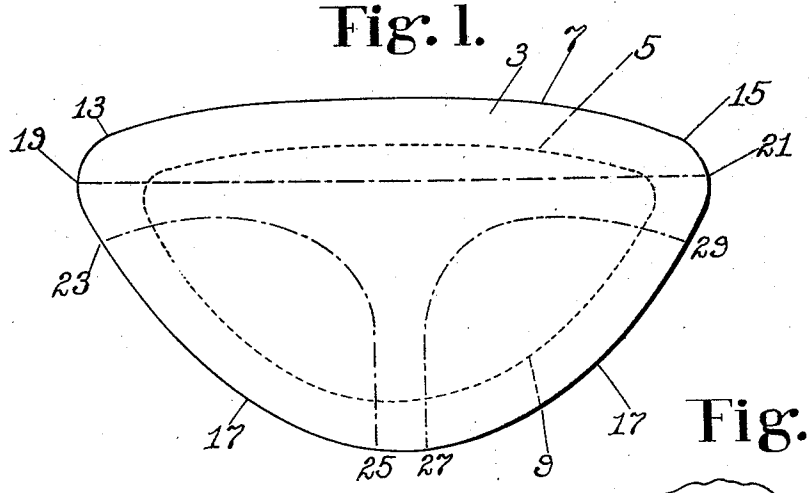


Fig. 3.

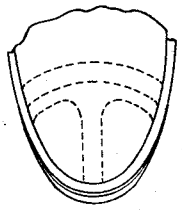
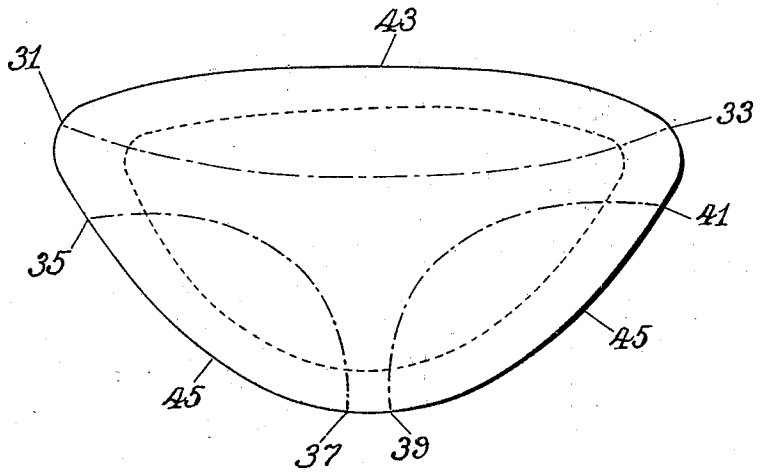


Fig. 2.



INVENTOR

Lucien P. Mellerio

By his Attorney

Nelson W. Howard

Patented May 24, 1932

1,859,452

UNITED STATES PATENT OFFICE

LUCIEN PAUL MELLERIO, OF LEICESTER, ENGLAND, ASSIGNOR TO UNITED SHOE MACHINERY CORPORATION, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY

SHOE STIFFENER AND SHOE

Application filed April 23, 1929, Serial No. 357,525, and in Great Britain May 16, 1928.

This invention relates to a stiffener for shoes and to a shoe having a portion of its upper stiffened in a particular manner.

In order to facilitate the manufacture of a shoe containing a thermoplastic toe stiffener it is desirable that the stiffener should soften relatively easily under the influence of heat and should remain in a softened condition for a suitable period of time after having been withdrawn from the source of heat. On the other hand, after the stiffener has been incorporated in a shoe and there is no further need to cause the stiffener to soften, it is desirable that it should be as little susceptible to heat as is possible, since if the stiffener softens after it has become part of the finished shoe, the toe portion of the upper of the shoe is liable to sag, or wrinkle or become otherwise deformed. The heat to which shoes are ordinarily subjected in a temperate climate is usually insufficient to produce undesirable softening of the stiffener, but shoes which are exposed to the sun for long periods in shop windows and shoes which are worn in tropical climates sometimes exhibit the deformities referred to above.

Thermoplastic toe stiffeners may be graded roughly into two classes—those very easy to work but lacking somewhat in resistance to heat to which the finished shoe may be exposed, and those markedly less easily workable but much more resistant to the effects of heat which the shoe may have to encounter. The difference in the thermoplasticity of the two grades of stiffeners need not be very great to be effective. For example, the range of temperature in which objectionable softening of the stiffener in the finished shoe is liable to occur lies between 100° and 130° F.; and the difference between a satisfactory stiffener and an unsatisfactory one would be that the satisfactory stiffener would resist objectionable softening somewhere in this range at a temperature ten degrees higher than would the unsatisfactory one.

It is an object of the present invention to provide improved stiffeners which are workable as easily as is the one grade above-mentioned and at the same time resist objectionable softening when in the shoe as reliably as does the other grade.

In order to produce a stiffened toe portion of an upper which shall resist unusual heat it is unnecessary that a stiffening substance of the same heat-resisting quality be used throughout the whole of the stiffener. The toe portion of the upper needs bracing principally in a region extending crosswise of the upper and adjacent to but spaced from the rear edge of the stiffener and in another region extending lengthwise of the upper from the toe end thereof. Moreover, these regions, in which the toe portion of the upper needs the most bracing, are precisely the regions in which the materials of the upper and of the stiffener need the least manipulating during their conformation to the toe portion of the last and in which, therefore, a thermoplastic stiffener least needs to be of the easy working type. The absence of a need for easy working qualities in the regions mentioned above is due to the fact that the powerful pulls of the pulling-over machine, applied as they are promptly after the softening of the stiffener, are capable of effecting the entire conforming of the upper and the stiffener to the last in these regions even though the thermoplastic material in these regions may not be of the easy working type.

On the other hand along the lasting margin of the stiffener between the points at the toe end and the points at the sides where the pulling-over machine tacks finally secure these parts of the stiffener in position, the stiffener should be easily softened by heat and should maintain its soft condition for an appreciable time to permit the proper operation of the lasting machine; and the same requirement for easy working qualities holds true for all those regions which are not drawn tightly about the toe portion of the last by the pulling-over operation.

According, therefore, to one feature of the invention there is provided a toe stiffener having a reinforcement adapted to produce in the upper in which the stiffener is incorporated a region which is stiffer than other regions, said reinforcement extending along

the lines of pull of the usual pulling-over machine which has three spaced grippers adapted to engage the toe end and two side portions of the stiffener. The illustrated stiffener comprises a fabric base impregnated with thermoplastic material of the easy working type and having a reinforcement which may consist of thermoplastic material of a less easy working type, in the region of the two bands mentioned above so as to extend along the lines of pull of the pulling-over machine.

Another feature of the invention relates to a shoe having a portion of its upper stiffened in the manner which has been described.

Referring now to the accompanying drawings,

Fig. 1 is a plan of a stiffener in which the present invention is embodied;

Fig. 2 is a plan of a modified form of stiffener, and

Fig. 3 is a perspective of the toe portion of a shoe on a reduced scale having incorporated therein a stiffener like that shown in Figure 1.

Referring first to Fig. 1, the stiffener is of the usual shape and has the usual skived or otherwise beveled rear margin 3 located between the dotted line 5 and the rear edge 7. The lasting margin of the stiffener, by which is meant that portion of it which is lasted over upon the insole of the shoe, is the arcuate strip or region which lies between the dotted line 9, extended to meet the rear edge of the stiffener at 13 and 15, and the curved front and side edges of the stiffener indicated by the full line 17. The region bounded by this lasting margin is the upper-stiffening region of the stiffener which, in the finished shoe, lies beneath the toe portion of the upper. The reinforced region is that lying between the dot-and-dash line 19, 21 and the two dot-and-dash lines 23, 25 and 27, 29. This region, it will be noted is of a general T shape, and might be of exactly T shape, with the cross-bar of the T extending crosswise of the stiffener and spaced somewhat from the rear edge 7 thereof and with the stem of the T extending rearwardly from the toe end of the stiffener and meeting the cross-bar at a locality substantially half way between its ends. The reinforced region in Fig. 1 has the angles included between the cross-bar and the stem of the T filled in to some extent; and, if desired, these angles may be filled in until the region becomes substantially a triangle with its base spaced somewhat from the rear edge of the stiffener and its apex at the forward end. The three ends or corners of such a region as has been described above may abut the inner edge of the lasting margin or may overlap it to an extent or may extend to the outer edge of the stiffener.

Fig. 2 shows a stiffener having a reinforced region which, while still substantially T-shaped, is of a different outline from that of the reinforced region of the stiffener shown in Fig. 1. In the stiffener shown in Fig. 2, the reinforced region is the region lying between the dot-and-dash line 31, 33 and the two dot-and-dash lines 35, 37 and 39, 41, the boundary line 31, 33 being curved away from the rear edge 43 of the stiffener so as to produce a stiffener having a more flexible rear portion than is present in the stiffener shown in Fig. 1.

In both the construction shown in Fig. 1 and that shown in Fig. 2, two unreinforced regions are present, one located on one side and the other upon the other side of a median longitudinal line through the stiffeners. In the blank of Fig. 1, these unreinforced regions are enclosed respectively between the dot-and-dash line 23, 25 and a portion of the line 17 and between the dot-and-dash line 27, 29 and another portion of the line 17. In Fig. 2, the unreinforced regions are enclosed one between the dot-and-dash line 35, 37 and a portion of the line 45 and the other between the dot-and-dash line 39, 41 and another portion of the line 45.

The stiffener may be reinforced in different ways. For example, a stiffener blank may be cut from porous sheet material such as fabric which has been lightly impregnated with one of the well-known thermoplastic compounds in use for making stiffeners of the easy working type. The compound may, for instance, consist of 90 percent colophony and 10 per cent carnauba wax. The fabric is not fully impregnated, with the result that the stiffener blanks are capable of absorbing additional thermoplastic material. Such blanks may then be treated in either of the following ways. The region desired to be reinforced may be coated, by use of a stencil with a compound of lesser thermoplasticity than that of the original impregnant of the blank. For example, Montan wax or shellac may be used in a molten condition. Alternatively the region desired to be reinforced may be covered by a patch of thin stiff fabric such as twill which, cemented to the body of the blank by heat and pressure, will give without undue increase of thickness just that small amount of added strength necessary to make an otherwise unreliable thermoplastic stiffener sufficiently resistant to the extreme heat it may be expected to encounter in the finished shoe.

Conveniently, the two latter courses may be combined, if desired, the patch of fabric being used to cover the coating of Montan wax or shellac and acting to give toughness to the coating, it being usual to find that thermoplastic compounds of relatively low thermoplasticity, such as those named, are apt unless modified by admixture of oily or resinous substances to crumble or crack under flexure if not fully absorbed in the body of

the blank or confined between and acting as a bond for fabric or like layers of the blank. For example, a stiffener blank cut from cotton cloth and incompletely impregnated with a compound of 90 per cent colophony and 10 per cent carnauba wax may have applied to the desired region a patch of muslin heavily coated with a compound comprising 50 per cent colophony and 50 per cent celluloid, and the patch and blank cemented into a unitary structure by heat and pressure. Although a stiffener having a unitary structure such as one of those which have been described above will preferably be employed, a two-part stiffener may be used. For example, an ordinary stiffener containing thermoplastic material of the easy working type may be assembled in the upper of a shoe along with a very thin sheet of celluloid of the outline desired for the reinforced region.

In all the examples given above it will be understood that the stiffer portion of the blank in the reinforced region will be conformed to the toe portion of the last principally by the strong pulls exerted upon it during the pulling-over operation and that the less stiff portions in the unreinforced regions will be conformed to the last principally in the subsequent lasting operation.

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

1. A toe stiffener having regions of different degrees of thermoplasticity, there being a region of lesser thermoplasticity terminating at three points on the edge of the stiffener, and regions of greater thermoplasticity separated from each other by a portion of the region of lesser thermoplasticity.

2. A toe stiffener having regions of different degrees of thermoplasticity, there being a region of lesser thermoplasticity terminating at three points located at the toe end and on the two sides of the stiffener and regions of greater thermoplasticity located one on one side and one on the other side of a median line extending lengthwise of the stiffener.

3. A toe stiffener having regions of different degrees of stiffness, there being a region of greater stiffness extending lengthwise of the stiffener from a locality in the forward portion of the stiffener to a locality spaced from the rear edge of the stiffener and thence crosswise of the stiffener, and two regions of a lesser degree of stiffness located one on one side and one on the other of a median line extending lengthwise of the stiffener.

4. A toe stiffener having different degrees of stiffness in different localities, said stiffener comprising a base of suitable shape, a band of thermoplastic material extending crosswise of the base and spaced from the rear edge thereof, and a band of thermoplastic material extending lengthwise of the base and meeting the first-named band substantially midway between its ends.

5. A toe stiffener comprising a porous base impregnated with a thermoplastic substance of a given degree of thermoplasticity, and having extending lengthwise of the stiffener a band comprising a thermoplastic substance having a lesser degree of thermoplasticity than that of the first-named substance.

6. A toe stiffener comprising a porous base impregnated with a thermoplastic substance of a given degree of thermoplasticity, and having extending crosswise adjacent to but spaced from the rear edge thereof a band comprising a thermoplastic substance having a lesser degree of thermoplasticity than that of the first-named substance.

7. A toe stiffener comprising a porous base impregnated with a thermoplastic substance of a given degree of thermoplasticity, and having two bands comprising a thermoplastic substance having a lesser degree of thermoplasticity than the first-named substance, one band extending crosswise of the stiffener and the other lengthwise, one end of the lengthwise band meeting the crosswise band.

8. A shoe the toe portion of which has regions of different degrees of stiffness, there being a region of greater stiffness extending from the toe end of the upper rearwardly and thence crosswise to the opposite sides of the shoe, and other regions of a lesser degree of stiffness adjacent to the stiff region.

9. A shoe the toe portion of which has regions of different degrees of stiffness, there being a region of greater stiffness extending from the toe end of the upper rearwardly, and two regions of lesser stiffness located one on each side of the stiffer region.

10. A toe stiffener having a reinforcement adapted to produce in the upper in which the stiffener is incorporated a region which is stiffer than other regions of the upper, said reinforcement being of less area than the stiffener and extending crosswise of the stiffener adjacent to the rear margin thereof and forwardly toward the toe end thereof.

11. A toe stiffener having a reinforcement adapted to produce in the upper in which the stiffener is incorporated a region which is stiffer than other regions of the upper, said reinforcement comprising thermoplastic material, being of less area than the stiffener and extending crosswise of the stiffener adjacent to the rear margin thereof and forwardly toward the toe end thereof.

In testimony whereof I have signed my name to this specification.

LUCIEN PAUL MELLERIO.