The invention is concerned with a shoe sole straightening device and, more particularly, an object of the invention is the development of a shoe tree which may be applied to the shoe or to a pair of shoes from the outside, viz., the outer sole face of the shoe or shoes.

A primary object of the invention is a tensioning device which, while clamping the shoe from the front part and the rear part thereof, subjects the sole to a bending moment tending to straighten the sole and thus to stretch the shoe.

More specifically it is an object to utilize for this stretching effect the pull by means of which a member which engages the rear face of the heel and a member which engages the front part of the sole of the shoe are urged against the shoe and in direction towards each other.

To this purpose, in the embodiment of the invention specifically disclosed, a toe member or toe plate which underlies a substantial part of the outsole and has a projection to engage the front part of the shoe, is fulcrumed at its front edge to the front edge of a frame which transmits the pull between heel member and toe member or toe plate when the heel member is tensioned against the shoe. The reaction exerted by the shoe tip under the clamping effect on the projection of the toe plate will tilt the toe plate about its fulcrum and the plate on its part will exert a stretching bending moment about the contact point of shoe tip and toe plate projection.

In a further development of the invention this stretching bending moment is enforced by an extensible and contractible spreader mechanism provided between, and pivotally secured to, on the one hand the frame and on the other hand that member, as a rule a rod, which transmits the clamping pull from the heel member to the frame. This spreader mechanism is adapted, when, on actuation and adjustment of the tensioning means and tightening of the tensioning means against the heel member, the shoe is being clamped between projection of the toe plate and heel member, to engage the toe plate operatively and tilt the same about its fulcrum and urge it against the outsole of the shoe.

The shoe is thus simultaneously clamped and subjected to a bending moment which tends to straighten the sole and thus to stretch the shoe.

A further object of the invention is the development of the aforesaid shoe sole straightening device symmetrically with regard to both its sides so as to be applicable to the soles of a pair of shoes, simultaneously. In this way, with one single implement, both shoes of a pair may be securely held in form and conveniently taken along on sporting trips such as for skiing and other purposes.

Since, in contrast with the conventional shoe trees—heavy blocks in the case of ski shoes—the interior of the shoes is kept free and fully open to air circulation, the shoes when humid or wet, such after use in snow, will readily dry whilst perfectly keeping their form and elasticity; and upward bending of the soles will be avoided, any shrinking of the soles and, also due to the perfect ventilation, any forming of mold or mildew.

Further objects and features of the invention will become apparent as the specific description of the shoe sole straightening device of the invention proceeds.

The invention will now be more specifically described with reference to the accompanying drawings which, by way of example, illustrate embodiments of the invention. It will be readily understood, however, that the drawings are intended to be explicative of the invention but not limitative of its scope. Other embodiments incorporating the principles underlying my invention are feasible without departing from the spirit and ambit of my appended claims.

In the drawings:

Fig. 1 is a side elevation of a shoe sole straightening device of the invention illustrated as applied to a pair of shoes;

Fig. 2 is a top view of the frame of the shoe sole straightening device with heel member and toe plate detached;

Fig. 3 is a plan view of the toe plate;

Figs. 4 and 5 respectively are rear and top views of the heel member;

Fig. 6 is a side elevation, partly in section and on an enlarged scale of the frame with toe plates, whereas

Fig. 7 is a similar view of a frame however with one toe plate for a shoe sole straightening device to be applied to a single shoe; both figures showing various positions of the spreader mechanism;

Figs. 8 and 9 respectively are rear view and side view of a modification of heel member for a shoe sole straightening device applicable to a single shoe.

In the drawings, the frame of the shoe sole straightening device, which may be of any appropriate material, such as aluminum or other light metal, is designated by 11, the heel member by 12, the toe plates by 13, 14, likewise of such material. The heel member may be of any suitable shape to engage the rear face or the rear part of a shoe or of a pair of shoes. Thus, in or-
der to engage the grooves 20 of the heels 21 of a pair of ski shoes 18, 19, as illustrated, the heel member may be provided with correspondingly shaped flanges 15.

With shoe sole straightening devices for a pair of shoes, the heel member will be formed symmetrically as Figs. 1 and 4 illustrate. With shoe sole straightening devices for individual shoes the heel members will be asymmetric, as heel member 23, Figs. 8 and 9, illustrate.

The heel member has a bore 16 by means of which it is loosely mounted and may be shifted on the tensioning or clamping rod 25.

The toe plates 13, 14, are provided at their front edge 25 with a projection 27 shaped and adapted to clasp the front part of the shoe, as Fig. 1 illustrates. Near the front edge 25, the toe plates are fulcrumed to the front edge of the frame 11 for instance as illustrated in Figs. 1, 6 and 7 by means of rivets 28. These rivets are loosely fitted in openings 29 of the toe plates 13, 14, and in bores 30 of frame 11, through which they are passed with clearances. The rivets, furthermore, are of a length which exceeds the combined thicknesses of the frame and the toe plate or the toe plates to such an extent that the toe plate or toe plates may to a certain degree be tilted about the fulcrum thus formed and relatively to the frame, as Figs. 1, 6 and 7 illustrate.

Such tilting movement will be produced under the clamping pull by the pressure of the shoe tip on the projection 27 acting as a lever, when, with a shoe placed in position between heel members 23 and 24, or 8, 9, or both, rod 25, in any manner directly secured to frame 11, is tightened by the tightening of an appropriate adjustable tensioning means such as the thumb nut 33 on screw thread 34 of rod 25.

A bending moment, as indicated by arrows 37, 38, is thus produced which tends to straighten or stretch the sole.

This tendency will be enforced when, in accordance with the further development of my invention an extendible and contractible member is provided between, and pivotally secured to, rod 25 and frame 11.

In the embodiment illustrated, this extendible and contractible member is constituted by a spreader mechanism disposed in an opening 40, Fig. 2, of the open work frame 11.

This spreader mechanism comprises for a shoe tree for use with an individual shoe a single toggle joint, levers 41, 42, and 44, 43, and joints 43, and 45, respectively, Fig. 7, of suitable material, iron or brass for instance.

For use with a pair of shoes, the spreader mechanism comprises a double toggle joint, levers 41, 42, and 44, 43, and joints 43, and 45, respectively, Fig. 6. By means of a pivot or pin 47 the free end of lever 41 or the free ends of levers 41 and 43 are pivotally connected to frame 11 whereas the free end of lever 42 or the free ends of levers 42 and 45 are pivotally secured, by means of pivot or pin 50, to the end of rod 25.

This end of rod 25 is shaped as a flat bar 55 which may be of piece with rod 25, or, as the figures show, may be a separate piece connected to rod 25. Bar 50 is provided with a longitudinal slot 51 which receives a pivot 47, and to the end of rod 25, when rod 25 is moved relatively to the frame in the one or the other direction, slide longitudinally within opening 48 of the frame without being impeded by pivot 47.

In the embodiment illustrated, bar 50, by means of a rivet which is, as is seen to the tongue 55 of a coupling piece 56 guided in a guide 57 provided in the rear wall 59 of frame 11 in extension of opening 40. Coupling piece 56 is provided with an inner screw thread shown at 59, Fig. 6, into which the screw threaded end 60 of rod 25 is screwed.

When the clamping pull on rod 25 from a shoe or a pair of shoes, in position on the shoe sole straightening device, is fully released, the spreader mechanism is fully collapsed and the toggle joint or joints will lie concealed within opening 40 of frame 11, the toe plates will lie contiguous to the faces of frame 11. When rod 25 is tightened against the shoe or shoes by the tightening of thumb nut 33, the spreader mechanism will be extended by contraction of the toggle joint or joints, and joint 43, or joints 43 and 45 will gradually tilt toe plate 13 or toe plates 13 and 14, in successive positions such as illustrated in Fig. 1 and, without shoes in Figs. 6 and 7.

With the extension of the spreader mechanism an increasing bending moment is exerted on the sole, tending to straighten the sole and thus to stretch the shoe. The shoe on the shoe sole straightening device will thus be kept in perfect form and dry, without any risk of shrinking, warping or other distortion.

A hook 62 may be provided at the front of frame 11, screwed and riveted at 63, for carrying the shoe sole straightening device with the shoes, by means of the hook, or for storing them suspended from the hook, if so desired.

Claims:

1. A shoe sole straightening device comprising a frame, a toe member, a heel member, and a clamping rod, said toe member disposed on said frame, said toe member and said frame having at their front edges a fulcrum common to them for pivotally securing said toe member to said frame, said toe member and said heel member shaped and adapted for engagement of the front part and the rear part of a shoe respectively, when said shoe sole straightening device is in position on the sole of a shoe; said clamping rod, at its one end, being provided with adjustable tensioning means associated with said heel member and adapted for displacing the same along and relatively to said rod into and out of clamping position, said clamping rod, at its other end, being secured to said frame, for thus, on adjustment and tightening of the tensioning means, to clamp said shoe between said toe member and said heel member and simultaneously to tilt under the clamping pull said toe member about said fulcrum and urging said toe member against the outside of said shoe; and thus subject said sole to a bending moment tending to straighten said sole and stretch said shoe.

2. A shoe sole straightening device comprising a frame, a toe plate, a heel member, and a clamping rod, said toe plate disposed on said frame, said toe plate and said frame having at their front edges a fulcrum common to them for pivotally securing said toe plate to said frame, said toe plate having a projection at said front edge, said toe plate with its projection and said heel member shaped and adapted for engagement of the front part and the rear part of a shoe respectively, when said shoe sole straightening device is in position on the sole of a shoe; said clamping rod, at its one end, the heel-end, being provided with adjustable tensioning means associated with said heel member and adapted for displacing the same along and relatively to said rod into and out of clamping position; an extendible and contractible
member being provided between, and pivotally secured to, the other end, the frame-end, of said rod and said frame; said extensible and contractible member constituting a spreader mechanism, adapted with said toe plate and adapted, when, on adjustment and tightening of said adjustable tensioning means, said shoe is being clamped between projection of toe plate and heel member, to engage said toe plate operatively and lift said frame-end and said frame against the outside of said shoe; and thus clamp said shoe and simultaneously subject said sole to a bending moment tending to straighten the sole and stretch said shoe.

3. A shoe sole straightening device as set forth in claim 2 wherein said extensible and contractible member is a joggle joint, the free ends of the joggle links being respectively pivotally connected to said frame-end of said rod and to said frame and the joint disposed to bear against and to engage operatively said toe plate.

4. A shoe sole straightening device as set forth in claim 2 wherein said frame has an opening and a guide for guiding longitudinal movement of said rod relatively to said frame, said guide being disposed in extension of said opening to the front of said frame, and wherein said extensible and contractible member is a joggle joint disposed in said opening, the free end of one of the links of said joggle joint being provided with a pivot mounted at said frame and the free end of the other of the links of said joggle joint provided with a pivot mounted at the frame-end of said rod, said rod being shaped with a longitudinal slot in the vicinity of said frame-end and extending in length over, and including in said slot, said frame pivot; thereby, when said shoe sole straightening device is in position on the sole of a shoe, through tightening of said rod and concomitant rearward movement thereof, longitudinally of and relatively to said frame, to contract said joint and cause it to bear against and urge said toe plate against the outside of said shoe, and, on releasing said rod and concomitant forward movement thereof to allow said joint to withdraw from and to release said toe plate.

5. A shoe sole straightening device comprising a frame, a pair of toe plates, a heel member, and a clamping rod, said pair of toe plates disposed symmetrically on both sides of said frame, both said toe plates and said frame having at their front edges a fulcrum common to all of them for pivotally securing said toe plates to said frame, each of said toe plates having a projection at said front edge, said heel member being extended symmetrically on both sides, said pair of toe plates with their projections and said heel member shaped and adapted for engagement of the front parts and the rear parts of a pair of shoes respectively, when said shoe sole straightening device is in position between the soles of a pair of shoes; said clamping rod, at its one end, the heel end, being provided with adjustable tensioning means associated with said heel member and adapted for displacing the same along and relatively to said rod into and out of clamping position; an extensible and contractible member being provided between, and pivotally secured to, the frame-end of said rod and said frame; said extensible and contractible member constituting a spreader mechanism associated with said pair of toe plates and adapted, when, on adjustment and tightening of said adjustable tensioning means, said pair of shoes is being clamped between the projections of said toe plates and said heel member, to engage both said toe plates operatively and tilt the same about said fulcrum and urge said toe plates against the outsides of said shoes; and thus to clamp said pair of shoes and simultaneously subject their soles to a bending moment tending to straighten the soles and stretch said shoes.

6. A shoe sole straightening device as set forth in claim 5 wherein said frame has an opening therethrough and a guide for guiding longitudinal movement of said rod relatively to said frame, said guide being disposed in extension of said opening to the rear end of said frame, and wherein said extensible and contractible member is a symmetrical double joggle joint disposed in said opening, the free ends of one of the links of each of said joggle joints being provided with a pivot common to them and mounted at said frame and the other ends of the other of the links of each of said joggle joints being provided with a pivot common to them and mounted at the frame-end of said rod; said rod being shaped with a longitudinal slot in the vicinity of said frame-end and extending in length over, and including in said slot, said frame pivot; thereby, when said shoe sole straightening device is in position on the soles of a pair of shoes, through tightening of said rod and concomitant rearward movement thereof, longitudinally of and relatively to said frame, to contract both said joints and cause them to bear against the toe plate associated therewith and urge it against the sole clamped thereon, and, on releasing said rod and concomitant forward movement thereof, to allow said joints to withdraw from, and to release, said toe plates.

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No references cited.