

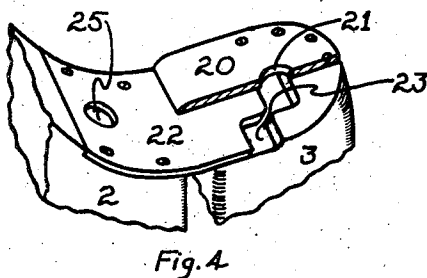
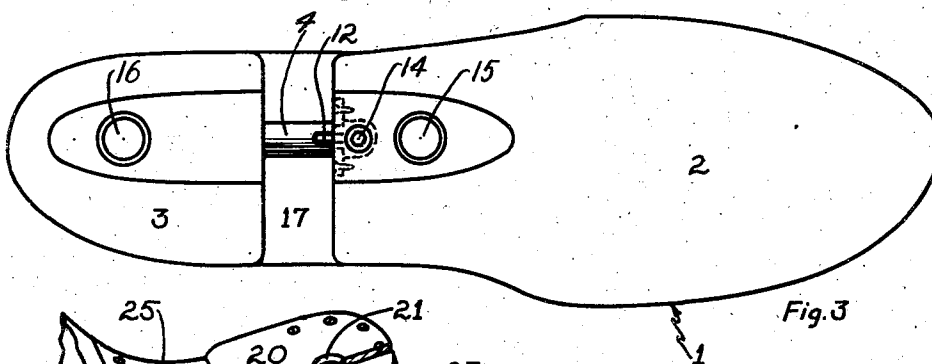
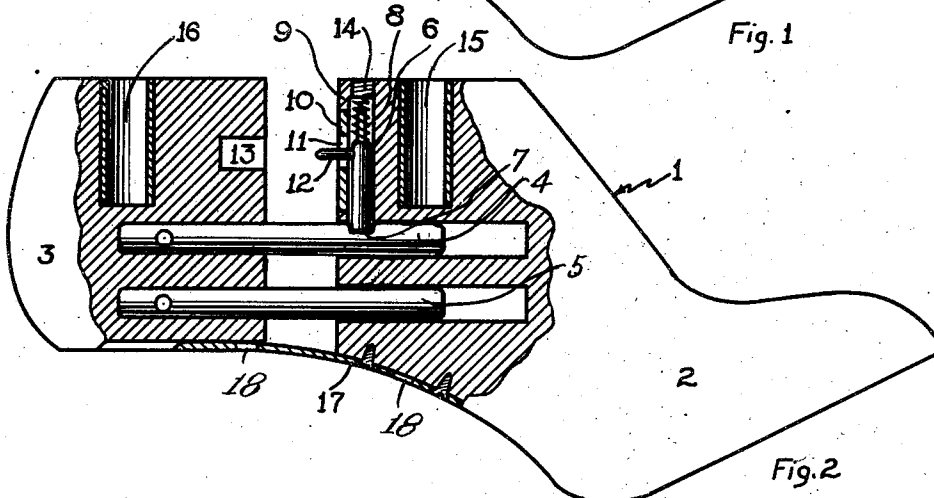
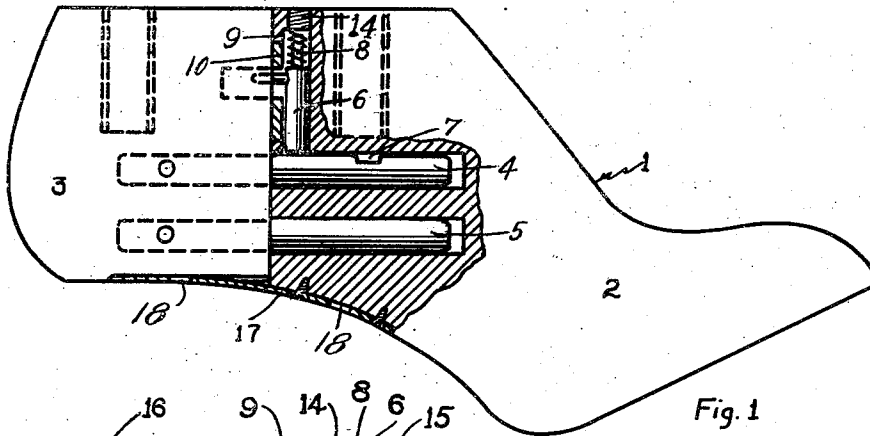
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J. S. KAMBORIAN

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SHOE LAST

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Inventor:  
Jacob S. Kamborian  
By *Robert C. Anderson* Attorney  
att'ys.

## UNITED STATES PATENT OFFICE

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## SHOE LAST

Jacob S. Kamborian, West Newton, Mass.

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13 Claims. (Cl. 12—135)

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This invention pertains to an improvement in the manufacture of footwear and more particularly to a last upon which shoes can be supported during the manufacture thereof, such last being so constructed and arranged as to facilitate its introduction into a shoe and its removal therefrom.

The copending application for United States Letters Patent, filed August 15, 1944, under Serial Number 549,560 by Jacob S. Kamborian discloses several forms of lasts and specifically points out the advantages of the use of such lasts in connection with the lasting of the so-called "force-lasted" type of shoe. The last embodying the present invention is also adapted for such use, as well as other uses, but differs from the lasts of that application in certain respects as will be set forth below.

The primary object of this invention is to provide a last comprising a forepart member and a heel part member such members being longitudinally separable, freely movable from the closed position to the opened position, and positively held in the opened position by a manually operable mechanism which when desired will permit the complete separation of the members, and the replacement of either member should the occasion arise. This property is of particular value in lasts for women's shoes since it is well known in the shoe industry that, although the styles of women's shoes change rapidly, such changes are at the forepart only, the contour of the heel being unchanged. Hence with lasts embodying this invention, when the style is changed, it is merely necessary to prepare new forepart members and substitute them for the forepart members of the present lasts. Consequently the investment required of manufacturers in lasts, as well as the amount of material, usually wood, employed in making the lasts have been materially reduced over the present practice of making entire lasts every time a change in style is called for. Moreover, there is a saving of material when the last is made initially since it is turned in the closed position and the forepart and heel part members thereafter cut apart.

A further object of this invention resides in the provision of means by which the tread area of the last is continuous when the members are separated in the opened position. Since the lasting operation upon the shoes takes place when the shoes are supported upon the last in the opened position, the provision of such means avoids the possibility that a portion of the shoe sole might be forced to enter such space during the lasting

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operation, thus injuring or marring the inner surface of the sole member. Moreover, since the members are moved into the closed position while the shoe is supported upon the last, the provision of such means reduces to a minimum any pinching of the sole during the approach of the members.

Another object of this invention resides in the mounting of the member holding mechanism so that the manually operable portion thereof projects into the space between the members when the last is in the opened position to be readily accessible for actuation from the top of the last and into a recess formed in one member when the last is in the closed position. It will be noted that this mechanism is entirely within the contour of the last so that it does not interfere with the lasting operations.

Other objects of this invention will be apparent from a consideration of the following description and of the drawings which form a part thereof and in which:

Fig. 1 is a view in side elevation of a last embodying this invention in the closed position, parts being broken away to disclose elements normally hidden;

Fig. 2 is a similar view of the last in the opened position;

Fig. 3 is a top plan view of such last in the opened position; and,

Fig. 4 is a bottom plan view taken in perspective of the rear end of another last embodying this invention.

The last 1 selected as an illustration of this invention comprises a forepart member 2 and a heel part member 3, connected by a pair of bars 4 and 5, rigidly fixed to one member and on which the other member is slidable. As shown in the drawing, one end of each of the bars 4 and 5, is fixed to the heel part member 3 and the other end is received by a bore in the forepart member 2, whereby the latter is slidable toward and from the member 3, being guided by the bars. The bars are in a common vertical plane thereby holding the members against any relative twisting movement. This has been found to be of great importance because of the tendency of the members to get out of alignment particularly during the lasting operations.

The last is held in the opened position (Fig. 2), by locking mechanism which comprises a bolt 6 yieldably held in engagement with a notch 7 in the bar 4 by a spring 8. The bolt 6 and spring 8 are mounted in a pocket 9 cut in the rear face of the forepart member 2 and closed by a remov-

able plate 10. Fixed to the bolt 6 and projecting outwardly through a slot 11 in the plate 10 is an arm 12. The free end of the arm 12 is readily accessible when the last is in the opened position and is received in a recess 13, formed in the front wall of the heel part member 3, when the last is in the closed position. An adjustable screw plug 14 bearing against the upper end of the spring 8 maintains the desired tension in the locking mechanism. The bolt 6 and notch 7 are so formed that when the last is in the opened position, the members are positively held against movement either toward or from each other.

The forepart member 2 and the heel part member 3 are provided with spindle sockets or thimbles 15 and 16 adapted to receive the spindles (not shown) upon which it is customary to support the last e. g. the spindles of a machine for shifting the members between the closed and opened positions. It will be understood however that, if desired, the last may be supported upon a single spindle inserted in one of the sockets, usually the socket 15 and the last opened or closed manually.

The latching mechanism need be actuated only when the last is in the opened position, at which time the arm 12 is readily accessible to the operator, by a suitable tool (not shown), preferably one having a hole or loop in one end which can be slipped over the end of the arm. It will be noted that no part of the latching mechanism projects at any point beyond the contour of the last so that it will not, in any respect, interfere with the handling of the last during the usual lasting operations.

The last 1 in the closed position, (Fig. 1) is introduced into the shoe to be lasted and the members 2 and 3 are then separated to shift the last into the opened position (Fig. 2) in which the members are automatically locked by the latching mechanism. Such separation can be carried out manually by the operator or by suitable mechanism prepared for that purpose. After the shoe has been lasted the arm 12 is tripped and the members 2 and 3 are brought into contact thus restoring the last to its closed position. The lasted shoe can thereupon be removed from the last without difficulty and any danger of wrenching or straining the shoe is eliminated. The space between the members 2 and 3 when the illustrated last is in the opened position is of the order of one-half inch. This distance was selected as providing a reduction in the length of the last which will permit its ready introduction into a shoe and removal therefrom while insuring solidity of the last in the opened position. It will be understood that if desired distances less or greater may be provided. However, whatever distance is selected will be the same in each last regardless of sizes.

In order to close the space between the members 2 and 3 at the bottom surface of the last when the last is in the opened position a plate 17 is secured at one end to the bottom of the forepart member 2, the free end of the plate 17 resting against the bottom of the heel part member 3. One or more holes 18 may be provided in the bottom plate 17 to permit the tacking of the insole required in the manufacture of certain types of shoes. The plate 17 is of a thickness sufficient to impart rigidity and to resist bending under the impact of blows upon the sole during the lasting or sole laying operations upon the shoe. The plate 17 is seated in depressions formed in the bottom surfaces of

the members and its free end is faced off at its upper surface to reduce to a minimum the depth of the depression in the heel part member which receives the free end of the plate. Such depression is exposed only when the last is in the opened position and is filled when the last is in the closed position. It will be noted that the plate 17 is of such dimensions that it is in contact with the sole at the heel of a shoe throughout the greater part of its surface except at the side and rear edges thereof. This is of advantage in that, when the last is returned to its closed position, only the edges of the heel part member move over the shoe sole, the forepart member and the plate being stationary with respect to the shoe.

Replacement of the forepart member 2 is made without difficulty, the last being moved into the opened position and the bolt 6 then being raised to permit the member 2 to be drawn off the bars 4 and 5. The new forepart member has been provided with the necessary bores to receive the bars, a pocket to receive the latching mechanism, and a depression to receive the bottom plate. The latching mechanism and the bottom of the member being replaced plate are easily transferred to the new forepart member before assembling.

In Fig. 4 is illustrated another last which differs from the last previously described with respect to the bottom plate. The tread of the heel part member 3 is covered by a plate 20 rigidly secured thereto in the usual manner and having a hole 21 therein through which tacks to secure the heel of the insole may be driven into the body of the member 3 should such an operation be found necessary. Fixed to the forepart member 2 is a plate 22 the free end of which enters a recess 23 formed in the member 3 beneath the plate 20. The forward edge of the plate 20 will be faced off to avoid marking or pinching the insole. A hole 25 is provided in the plate 22 through which an insole securing tack may be driven.

The last embodying the present invention is peculiarly adapted for use in the manufacture of the so-called "force-lasted" shoes. Such shoes as pointed out in the above application have a flexible sock lining stitched at its margin to the upper and are lasted by forcing the last into the shoe. The last of this invention while in its closed position can be easily introduced into such a shoe and when thereafter expanded into its open position it will exert the lasting stress necessary to form the shoe. Similarly after the shoe is completed the last can be restored to its closed position and removed from the shoe. Other uses for this last include the manufacture of soft soled slippers, and the treeing or relasting operations performed upon certain types of footwear. The provision of the sockets 15 and 16 in the last facilitates its employment for such uses.

While two embodiments of this invention have been illustrated and described in detail it will be understood that the invention is not limited thereto and that other embodiments may be made without departing from the spirit and scope of the invention as set forth in the following claims.

I claim:

1. A last comprising a forepart member and a heel part member, which members are longitudinally separable, guiding means carried by one of said members and received in the other member; whereby the second member is guided for movement into contact with the first member to place the last in the closed position and from the first member to place the last in the opened posi-

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tion, and latching mechanism by which the members are held a fixed distance apart when the last is in the opened position, said latching mechanism being mounted on said second member within the contour of the last and including an arm which projects from that surface of said member nearest the first member and is receivable in a recess in that surface of the first member nearest the second member when the last is in the closed position, which arm is actuatable to allow the complete removal of the second member from such guiding means.

2. A last comprising a forepart member and a heel part member, which members are longitudinally separable, parallel bars, one end of each bar being fixedly secured in one member and the other end of each bar being received in a bore in the other member, whereby the second member is guided for movement over said bars into contact with the first member to place the last in the closed position and from the first member to place the last in the opened position and latching mechanism mounted within a pocket in the second member and adapted to engage one of said bars to hold said second member a fixed distance from said first member when the last is in the opened position, said latching mechanism including actuating means located wholly within the contour of the last and actuatable to allow the complete removal of the second member from said bars.

3. A last comprising a forepart member and a heel part member, which members are longitudinally separable, parallel bars, one end of each bar being fixedly secured in one member and the other end of each bar being received in a bore in the other member, whereby the second member is guided for movement over said bars into contact with the first member to place the last in the closed position and from the first member to place the last in the opened position, and latching mechanism mounted within a pocket in the second member and adapted to engage one of said bars to hold said second member a fixed distance from said first member when the last is in the opened position, said latching mechanism including an arm which projects outwardly from said pocket and is easily accessible for actuation when the last is in the opened position to permit movement of the second member over said bars.

4. A last comprising a forepart member and a heel part member, which members are longitudinally separable, parallel bars, one end of each bar being fixedly secured in one member and the other end of said bar being received in a bore in the other member, whereby the second member is guided for movement over said bars into contact with the first member to place the last in the closed position and from the first member to place the last in the opened position, and latching mechanism mounted within a pocket in the second member and adapted to engage one of said bars to hold said second member a fixed distance from said first member when the last is in the opened position, said latching mechanism including an arm which projects outwardly from said pocket and is easily accessible for actuation when the last is in the opened position to permit movement of the second member over said bars in either direction.

5. A last comprising a forepart member and a heel part member, which members are longitudinally separable, parallel bars, one end of each bar being fixedly secured in the heel part mem-

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ber and the other end of each bar being received in a bore in the forepart member whereby the forepart member is guided for movement over said bars into contact with the heel part member to place the last in the closed position and from the heel part member to place the last in the opened position, and latching mechanism mounted within a pocket in the forepart member and adapted to engage one of said bars to hold said forepart member a fixed distance from said heel part member when the last is in the opened position, said latching mechanism including actuating means located wholly within the contour of the last and actuatable to allow the complete removal of the forepart member from said bars.

6. A last comprising a forepart member and a heel part member, which members are longitudinally separable, parallel bars, one end of each bar being fixedly secured in the heel part member and the other end of each bar being received in a bore in the forepart member, whereby the forepart member is guided for movement over said bars into contact with the heel part member to place the last in the closed position and from the heel part member to place the last in the opened position, and latching mechanism mounted within a pocket in the forepart member and adapted to engage one of said bars to hold said forepart member a fixed distance from said heel part member when the last is in the opened position, said latching mechanism including actuating means located wholly within the contour of the last and actuatable to allow movement of the forepart member over said bars.

7. A last comprising a forepart member and a heel part member, which members are longitudinally separable, parallel bars, one end of each bar being fixedly secured in the heel part member and the other end of each bar being received in a bore in the forepart member, whereby the forepart member is guided for movement over said bars into contact with the heel part member to place the last in the closed position and from the heel part member to place the last in the opened position, and latching mechanism mounted within a pocket in the forepart member and adapted to engage one of said bars to hold said forepart member a fixed distance from said heel part member when the last is in the opened position, said latching mechanism including actuating means located wholly within the contour of the last and actuatable to allow movement of the forepart member over said bars in either direction.

8. A last comprising a forepart member and a heel part member, which members are longitudinally separable, parallel bars, one end of each bar being fixedly secured in the heel part member and the other end of each bar being received in bores in the forepart member, whereby the forepart member is guided for movement over said bars into contact with the heel part member to place the last in the closed position and from the heel part member to place the last in the opened position, and latching mechanism mounted within a pocket in the forepart member and adapted to engage one of said bars to hold said members a fixed distance apart when the last is in the opened position, said latching mechanism including actuating means located wholly within the contour of the last and actuatable to allow removal of the forepart member from said bars and replacement thereof by another forepart member.

9. A last comprising a forepart member and a

heel part member, which members are longitudinally separable, means whereby one member is guided for movement into contact with the other member to place the last in the closed position and for movement a fixed distance from the other member to place the last in the opened position, and means for closing the space between the members at the bottom of the last when the latter is in the opened position, said means comprising a plate fixed at one end to the bottom surface of the forepart member and bearing at its free end upon the bottom of the heel part member within a recess formed therein, and a plate fixed to the bottom of the heel part member over the recess formed therein.

10. A last for use in the manufacture of footwear, said last comprising a heel member and a forepart member, each of said members having a spindle-socket in its upper part, a pair of vertically spaced parallel guide rods having their axes in the plane of the axes of the sockets, each guide rod being fixed at one end in one of said last members and being free to slide in a bore in the other of said last members, the upper one of said guide rods having a single notch in that portion which slides in its respective bore, and a detent housed within the substance of that last member in which the upper guide rod slides, spring means urging the detent toward the upper guide rod for engagement with the notch in the latter, and an actuator for retracting the detent from the notch, the actuator being exposed between the opposed faces of the last members when the last is extended.

11. A last for use in the manufacture of footwear, said last comprising a heel member and a forepart member, each having therein a spindle-socket, rigid guide means fixed to and projecting from one of said last members and which is received with a sliding fit in the substance of the other last member, said guide means being of greater depth vertically than horizontally and being disposed in the plane of the axes of the spindle sockets, that last member in which the guide means slides having therein a bore in the plane of the spindle-socket axes, means closing the upper end of said bore, a detent housed within said bore, said detent being engageable with an element of the guide means to hold the last parts in extended position, spring means tending to project the detent into operative position, and an actuator, exposed between the last members, when the last is extended, operative to retract the detent thereby to permit contraction of the last.

12. In a last for use in the manufacture of footwear, said last comprising a heel member and a forepart member, the opposite faces of

said members being substantially flat and vertical, a pair of parallel, vertically spaced guide rods fixed at their rear ends in the heel member and having their forward parts arranged to slide in corresponding bores in the forepart member, the upper of said rods having a notch in its upper portion within its guide bore, the forepart member of the last having a detent-receiving bore whose axis is in the vertical plane of the axes of said guide rods and which intersects the bore which receives the upper guide rod, means closing the upper end of the detent-receiving bore, a detent within said detent-receiving bore, a spring housed wholly within the forepart member of the last and arranged to urge the detent downwardly, and an arm fixed to the detent and projecting out through an aperture in the vertical rear face of the forepart member of the last.

13. A last for use in the manufacture of footwear, said last comprising a heel member and a forepart and toe member, said members being movable relatively to each other along a rectilinear path into last-extended and last-contracted positions, rigid guide means constraining said members when so relatively moved to travel along said path, said guide means being so constructed and arranged as to permit complete separation of the last members, detent means housed wholly within the contour of one of said last members and operative automatically to limit further extension and to prevent contraction when the last members have been disposed to produce a last of predetermined effective length, and release means accessible within the space between the last members, when the last is fully extended, for moving the detent to inoperative position thereby to permit complete separation of the last members.

JACOB S. KAMBORIAN.

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