May 18, 1954 A. W. McNEILL 2,678,455

COLLAPSIBLE LAST

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Fig. 1

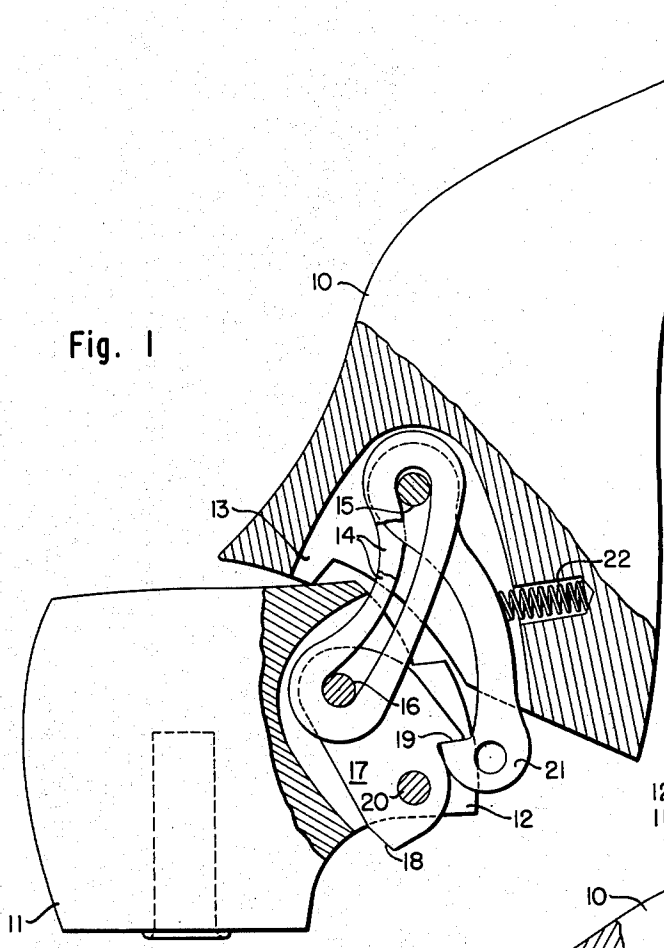
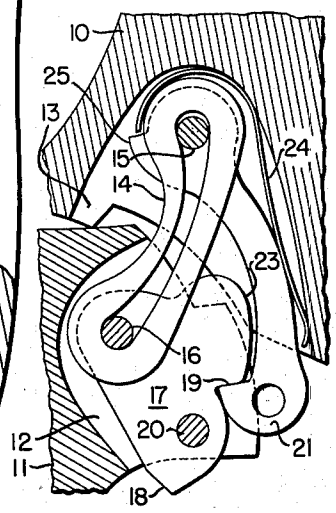


Fig. 3



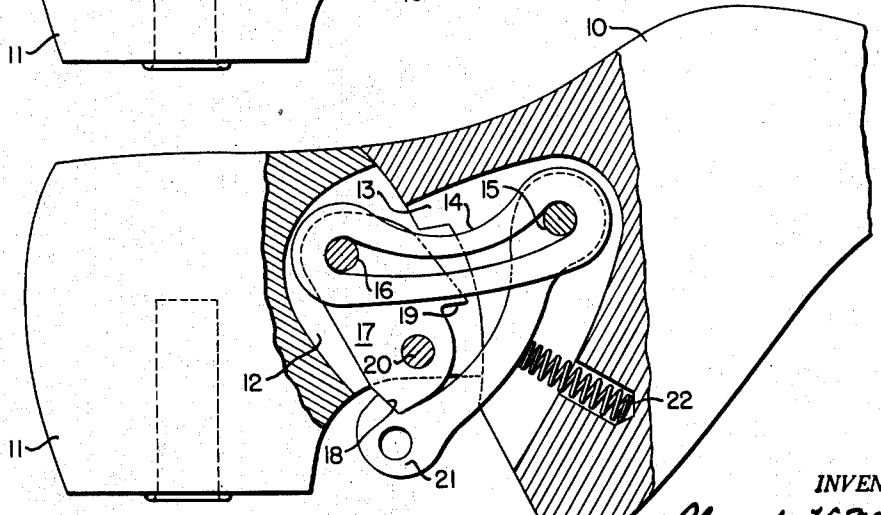


Fig. 2

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COLLAPSIBLE LAST

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16 Claims. (Cl. 12—136)

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This invention comprises a new and improved last having novel characteristics which adapt it particularly well for use in the slip lasted process of shoemaking, although they may be embodied with advantage in all other types of lasts.

In the manufacture of slip lasted shoes, it is the practice to spindle the last on a vertical pin and to swing its toe portion upwardly into an approximately 45° position as the most convenient for pulling the previously fashioned upper upon the last. This operation is usually carried out by a powerful operator who exerts such a strong pull through the upper upon the toe portion of the collapsed last that frequently a section is split out from the bottom of the last while in other cases the plates of the last hinge are caused to cut through the wooden bottom of the last.

The principal object of the present invention is to provide a last in which the toe portion may be supported in the upwardly inclined collapsed position of the last above described in such a manner that the wood in the bottom of the forepart is not subjected to excessive direct splitting force. The invention further contemplates a construction which will permit quick and substantial shortening of the last when it is collapsed in order that it may be withdrawn easily from the upper without undue strain.

In one aspect my invention is characterized by last hinge mechanism including a positive retaining latch which is automatically engaged when the last is collapsed and which transfers to its own metal parts the strain caused by the powerful pull of the operator increased in magnitude by the leverage of the forepart. This would otherwise be resisted only by wooden parts of the last.

Another essential requirement is that the operations of locking and unlocking the last must be effected instantaneously and this is effected in the improved last of my invention by a primary spring latch which automatically engages when the last is elongated and which may be readily disengaged by a slight movement when the last is to be collapsed. Going more into detail, the last hinge plates of my invention include a bowed link herein shown as anchored in the forepart of the last and extending diagonally and upwardly into position to engage a stationary catch or abutment located in the top of the heel member. While a positive latch is provided in this manner, the latch link itself is bowed in shape so that it may slightly elongate in case the closed or lengthened last is subjected to excessive or improper pressure in the sole leveling machine, or otherwise. The slight yield permitted in this manner prevents the anchor pins from being pulled out of position, thus permanently damaging the last while at the same time the link is effective through its resiliency to restore the two parts of the last accurately to their proper relationship upon the removal of such improper distorting force.

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As herein shown and in accordance with another important feature of my invention, the latch link is so shaped and controlled in its movement that it makes a secondary latching engagement in the collapsed position of the last and holds the toe portion in the required upwardly inclined position for the reception of the upper.

In accordance with still another feature of the invention a metallic plate is fastened in one part of the last and shaped to extend freely into the body of the other part at all times and to hold the two parts positively against any relative twisting or weaving motion. Especially does this strengthen and stiffen the last in the sole leveling operation where the leveling pressure is often exerted in an oblique or lateral direction. As herein shown, the latch plate in the heel portion is utilized for this second function by being provided beneath its intermediate latching abutment with a forward extension that projects into the slot of the forepart.

These and other features of the invention will be best understood and appreciated from the following description of a preferred embodiment thereof, selected for purposes of illustration and shown in the accompanying drawings in which:

Fig. 1 is a view in elevation, partly in section, of the last in collapsed condition,

Fig. 2 is a similar view showing the main portions of the last in extended position, and

Fig. 3 is a fragmentary sectional view showing connecting mechanism of modified construction.

The last herein shown comprises a forepart 10 and an interfitting heel part 11. The mating faces of these parts are complementary to each other except that they diverge toward the cone of the last to provide an open space into which an operating portion of the connecting mechanism projects so that it may be unlatched for collapsing the last. The heel part 11 is provided with a slot or rout 12 and in the mating face of the forepart is formed a registering slot or rout 13 in which the connecting mechanism is housed. The mating faces are shouldered at an inter-

mediate point to form an interlocking engagement when the last is lengthened or expanded.

The connecting mechanism comprises an elongated tension link 14 which comprises two identical spaced members herein shown as curved and slotted but not necessarily so. They are provided with an anchor pin 15 in the forepart, and an anchor pin 16 in the heel part of the last. These links are disposed in the lower portion of the last and are themselves the subject-matter of my prior Patent No. 2,188,414 dated January 30, 1940 although they are herein shown as employed in a new combination.

The two members of the tension link 14 are separated by an intermediate latch plate 17 formed at its upper end to provide a latching abutment 18 and having a second or inner latching abutment 19 at an intermediate point in its forward edge. The latch plate is a stationary element and is fastened in place in the slot 12 by the anchor pin 16 and a second transverse pin 20 located about midway between its two latching abutments. The plate constitutes means presenting two latching abutments disposed at different levels in the last, the abutment 19 being nearer the bottom of the last than the abutment 18.

A bowed latching link 21 is pivotally mounted upon the forepart anchor pin 15 in the slot 13 and has an outer hook-shaped end adapted to engage and fit either the latching abutment 18 or the inner abutment 19 as the case may be. The head of the link extends into the divergent open space which is located immediately in front of the cone of the last so that it may be conveniently reached to be disengaged from the latching abutment 18 in the straightened last. It has an external rounded surface so that it may also be engaged by projecting a wedge upwardly into the space between it and the inner face of the heel part of the last and is perforated so that it may be engaged by a hook if desired. The link 21 is bowed so that it may flex and lengthen slightly to relieve the last of improper excess pressure if it should be mistreated in use.

In Fig. 2 the forepart of the last is shown as provided with a compression spring 22 which is arranged to bear upon the convex edge of the latch link 21 and press the link always against the forward edge of the latch plate 17 and also to cause its latching head to interlock with one or other of the latching abutments 18 or 19. It will be understood that any suitable form of spring may be employed. In Fig. 3 there is shown a leaf spring 24 curved at its lower end to embrace the curved ends of the tension link 14 and bowed to engage the convex edge of the latch link 21.

In Fig. 3 a latch plate of modified contour is shown, the plate being provided with a forwardly extending projection 23 in its periphery below the latching abutment 19. This extension projects freely into the slot 13 of the forepart. Its forward edge is curved to correspond to the concave edge curvature of the link 21 so that it may extend forwardly into the body of the forepart 10 as far as possible without in any way interfering with the latching and unlatching movement of the link 21.

The action of the connecting parts shown in Fig. 3 correspond to the action of the parts already described except that in all positions of the last the forward extension 23 of the latch plate is freely movable in the slot 13 of the forepart and acts positively at all times to prevent lateral displacement thereof. In this figure the latch link 21 is shown as provided in its lower end with a projecting shoulder 25 located to engage the end of the leaf spring 24 and hold it against displacement in the forepart of the last.

The double construction of the tension link 14 is of particular advantage in the connecting mechanism of this invention in that the two parts of the link support the latch link 21 on both sides and so hold it in a central position in the slot 13 and in exact transverse alignment with the latch plate 17. The hooked end of the latch link is therefore guided along the curved edge of the latch plate without danger of lateral displacement, and latching engagement with the abutments 18 and 19 is positively assured. If desired the two parts of the tension link 14 can be extended upwardly to provide a more extensive bearing area on the link 21 than is actually shown in Fig. 3. In general it has been found beneficial to fill in the slots 12 and 13 with as much metal as possible without interfering with the function of the parts in order to maintain and support the two parts of the last in fixed longitudinal relation.

An advantage of the construction above described is that in all positions of closing, after the operator has pulled the forepart of the shoe upon the last, the closing of the last to locking position is fully under the control of the operator. There is no snap action that might catch the upper improperly placed upon the last, but on the contrary the operator can stop the closing movement of the last at any time for straightening the back seam or otherwise positioning the upper and then continue the closing movement by degrees simultaneously with adjustment of the upper.

It will be seen that when the last is lengthened, the shoulders of the mating faces of its two parts interlock and are held together by the tension link 14, while any separation of the parts is prevented by engagement of the latch link 21 with the latching abutment 18 of the stationary latch plate. When now it is desired to collapse the last, the latch link 21 is swung forwardly by a hook or wedge sufficiently to disengage the latching abutment 18. Thereupon the forepart may be swung upwardly into the position shown in Fig. 1 while the head of the latch link 21 rides along the curved front edge surface of the latching plate 17. The upward swing of the toe portion 10 is positively arrested when the hook of the latch link 21 engages the intermediate or inner latching abutment 19 of the latch plate. This position of the parts is shown in Fig. 1 from which it will be noted that the spring 22 holds the latch link under substantial pressure in latched position and therefore yieldingly supports the forepart 10 of the last in its upwardly projecting position conveniently for the reception of the upper.

After the upper has been pulled onto the forepart and located over the heel part, the last may be extended and lengthened by merely pressing downwardly on the forepart. As the forepart is rocked downwardly, the hooked head of the latch lever 21 rides downwardly upon the forward edge of the latch plate 17 until it reaches the position of Fig. 4 and interlocks with the latching abutment 18.

Having thus disclosed my invention and described in detail illustrative embodiments thereof, I claim as new and desire to secure by Letters Patent:

1. A collapsible last comprising a heel portion having a stationary latch plate therein presenting catch abutments at two different points in its periphery, a forepart portion having a latch link pivotally mounted therein and shaped to engage one catch abutment when the last is collapsed and the other abutment when the last is elongated, and a tension link pivotally connecting the heel and forepart portions of the last.

2. A collapsible last comprising heel and foreparts having mating contact surfaces, an anchor pin in each part of the last and a tension link connecting said pins, together with a stationary latch plate secured in place in the heel part by its said anchor pin and presenting catch abutments at its upper end and at an intermediate point in one edge, and a latch link pivotally mounted in the anchor pin of the forepart and shaped to engage one at a time of said catch abutments.

3. A collapsible last as described in claim 2 in which the latch link is bowed and thus permitted to yield and relieve the application of excessive pressure to the last.

4. A collapsible last as described in claim 3 in which a spring is provided in the foreport of the last and is effective to hold the latch link engaged with said intermediate abutment when the last is collapsed.

5. A collapsible last comprising heel and foreparts having mating surfaces, a latch plate rigidly fastened in the heel portion of the last and having a curved surface terminating in a catch abutment, a pivoted latch link in the forepart having a hooked end slidable on the curved surface of the latch plate into engagement with said catch abutment when the last is collapsed, and a spring for yieldingly maintaining such engagement and thus holding the forepart in its collapsed position.

6. A collapsible last comprising heel and foreparts having mating surfaces, a tension link pivotally connected at its opposite ends to the respective parts of the last, a latch link pivotally mounted in the forepart of the last, means in the heel part of the last presenting catch abutments at different levels, and a spring biasing the latch link into engagement with one abutment when the last is collapsed and into engagement with the other abutment when the last is expanded.

7. A collapsible shoe last comprising interfitting heel and foreparts having aligned routs and connecting means disposed in the routs and including a link having an anchor pin in each last part, means in the heel part rout presenting fixed abutments at different levels therein, a latch lever pivotally mounted in the forepart rout and having a catch for releasably locking the last parts in expanded position through the medium of one of said fixed abutments and releasably locking the last parts in collapsed position through the medium of the other fixed abutment for limiting the movement of the forepart beyond a predetermined angular position with respect to the axis of the last.

8. A collapsible last having interfitting heel and foreparts provided with registering slots in their mating faces, a tension link connecting the said parts near the bottom of the last, a metallic latch plate fast in the slot of the heel part and having a forward extension projecting movably into the slot of the forepart and spaced latching abutments in its periphery, and a spring operated latching link pivotally mounted in the slot of the forepart for engagement with the said latching

abutments respectively when the last is straightened or collapsed.

9. A collapsible last as described in claim 8 in which a pair of spaced tension links are employed and the latch link is located between the two tension links and thereby held in a central position in the last.

10. A collapsible last as described in claim 8 in which a leaf spring is located in the forepart of the last and curved to bear on the back of the latch link, and the latch link has a projecting shoulder bearing against the end of the spring.

11. A collapsible last comprising heel and foreparts, and connecting mechanism comprising tension links, a latch plate fast in the heel part having spaced latching abutments in its periphery and a forward extension which is received in the body of the forepart, a bowed latch link pivotally mounted in the forepart adjacent to one end of the tension link and having a hooked end shaped to engage the edge of the latch plate, and a spring bearing upon the convex edge of the latch link and acting to interlock it with either of said abutments.

12. A collapsible last comprising heel and foreparts, and connecting mechanism comprising a double tension link having anchor pins at its end in the respective last parts, a bowed latch link pivotally mounted on the anchor pin in the forepart between the members of the double tension link and having a hook shaped end with a rounded exterior, a latch plate fastened in the heel part by the heel part anchor pin and projecting forwardly into the body of the forepart, having also a latching abutment at its upper end and another latching abutment at an intermediate point in its forward edge, and a leaf spring in the forepart urging the latch link at all times toward the said latch plate.

13. A collapsible last comprising heel and foreparts having mating surfaces, a latch plate fastened in the heel part of the last and having a continuous edge surface terminating in a catch abutment, a pivoted latch link in the forepart having a hooked end slidable on the said edge surface of the latch plate into engagement with its catch abutment when the last is collapsed, and a spring for maintaining such engagement and thus holding the forepart in its collapsed position.

14. A collapsible last comprising heel and foreparts having mating surfaces, a latch plate rigidly fastened in one portion of the last and having an inner catch abutment located fully within the body theerof, a latch link pivoted in the other part of the last and having a hooked end engageable with said catch abutment when the last is collapsed thereby holding the forepart against rearward pressure, a second catch abutment located nearer to the top of the last than said inner catch abutment, and a spring urging the link into engagement with one of the abutments as the last is collapsed and the other of the abutments as the last is straightened.

15. A collapsible shoe last comprising interfitting heel and foreparts having aligned routs, and part connecting means disposed in the routs and including a link having an anchor pin in each part, a heightwise catch plate fixedly mounted in the heel part rout, a latch lever pivotally mounted in the forepart rout, cooperative means on the lever and the upper portion of the catch plate for releasably locking the last parts in expanded condition, said catch plate having a lever cooperating means on the lower portion thereof for limiting upward movement

of the forward portion of the heel part beyond a predetermined spaced position with respect to the link when the last parts are moved to collapsed condition.

16. A shoe last according to claim 15 characterized by the fact that the two lever cooperative means are formed in the forward edge of the catch plate and the lever is yieldably urged into engagement with the said forward edge of the catch plate.

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