

E. O. KRENTLER.

LAST.

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347,972.

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Fig. 1.

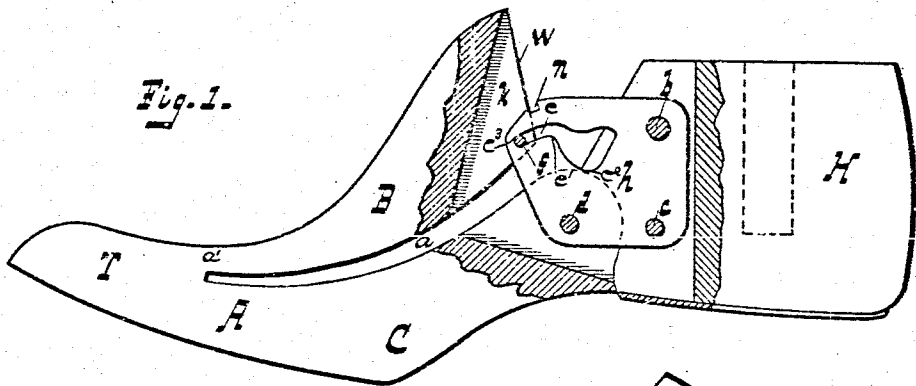


Fig. 2.

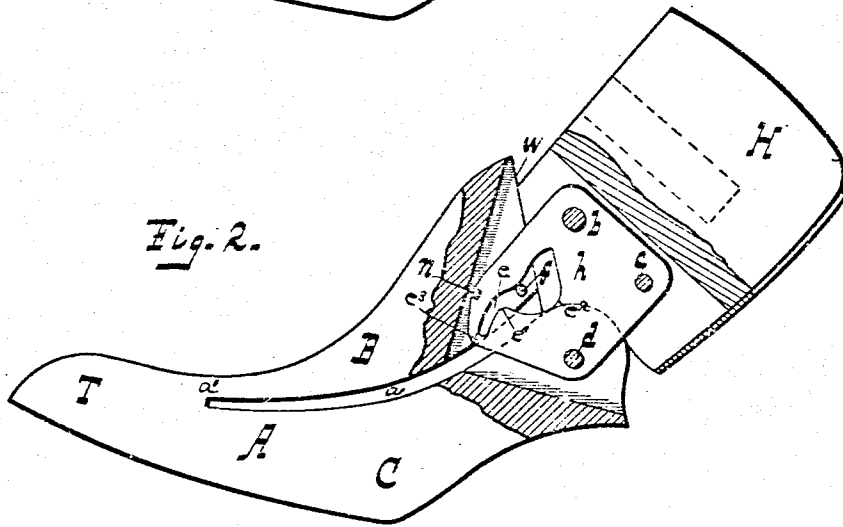
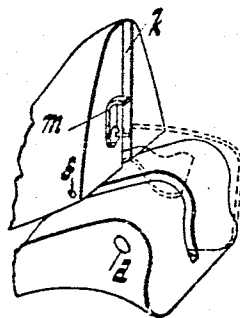


Fig. 3.



WITNESSES

R. D. Parker.

May E. Kott.

INVENTOR

Edwin O. Krentler

By

Parker & Burton

Attorneys.

UNITED STATES PATENT OFFICE.

EDWIN O. KRENTLER, OF DETROIT, MICHIGAN, ASSIGNOR TO KRENTLER-ARNOLD
HINGE LAST COMPANY, OF DETROIT, MICHIGAN. A CORPORATION OF MICHIGAN.

LAST.

947,972.

Specification of Letters Patent.

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To all whom it may concern.

Be it known that I, EDWIN O. KRENTLER, citizen of the United States, residing at Detroit, county of Wayne, State of Michigan, have invented a certain new and useful Improvement in Lasts, and declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

This invention relates to lasts, and primarily to first lasts adapted for use in the manufacture of shoes, and more particularly in the manufacture of turn shoes, the great advantage and principal object of the invention, in this respect, residing in having the last capable of contracting and expanding its waist measurements so that in the latter position the last-measurements at the waist of the last exactly correspond to the shoe-waist measurements, the last being then in exactly correct shoe-filling or full-waist position, whereas the contraction of the last at its instep provides the shoemaker with room enough for his lining knife in straightening out the wrinkles in the shoe after the vamp has been turned. In making turn shoes, after the shoe is all sewed together and lasted, it is turned and relasted, the upper then being in its finished relation with the outside of the shoe outward, and it has been customary in relasting with a block last to force the last in as far as possible by hand and then pound severely downward on the heel of the last to force the last thereby into seated position within the shoe, the result being that the shoe-upper is carried forward severely by the last and is compelled to yield in a forward direction so that the toe-part of the leather is distorted and is sometimes carried beyond the sole, changing and destroying the proper contour of the toe.

The chief object of the present invention is to provide means for rendering this result impossible, and this is accomplished by providing a construction of last in which the waist and ball measurements of the last are all reduced when the last is collapsed, *i. e.*, as the heel-part moves upwardly so that the last is collapsed or shortened. By having the waist and ball measurements thus reduced when the heel is moved into collapsed or shortened position, it follows that there is

no difficulty whatever in placing the forepart by hand into proper position in the shoe. The operator then runs his smoothing knife around between the reduced forepart of the last and the comparatively limp or non-stretched upper, removing all wrinkles in the leather, and when the forepart is in absolutely correct position in the shoe and the upper is in correct position on the forepart, the heel-part of the last is lowered or moved down into the heel of the shoe, and the instep part of the last expands and is locked in absolutely correct and unvarying full-waist position, so that, instead of stretching the upper toward the toe as before, the upper is simply stretched outwardly and circumferentially at the waist and ball. As my invention entirely eliminates the forward movement of the leather than is no unequal strain on the eyelets or button-holes and no tendency to distort the shape or style of the shoe. My invention includes means for holding or locking the full-waist forepart measurements uniform or always the same under all conditions of use, irrespective of whatever external pressure may be applied on the shoe in the course of the treeing and finishing operations.

Besides the above two leading features of my invention, further important features of the preferred embodiment of the invention reside in making the last sufficiently strong for a first last notwithstanding the fact that it is made out of wood and is cut away to a considerable extent in its interior, this strength being secured by raising the slot or longitudinal cut which separates the rear part of the instep block from the lower portion of the forepart, on or above the line of the widest or most laterally extended portion of the last when viewed on the inside thereof, and by forming the instep block integrally with the body of the forepart at the toe end of the instep block, the straight grain of the last at the latter point providing other advantages, as more fully pointed out hereinafter.

Further minor features of my invention, as hereinafter claimed, are embodied in the preferred construction shown in the drawings.

In the drawings:—Figure 1 shows, in side elevation, my last in all its preferred details, parts being broken away for clearness of illustration: Fig. 2 is a similar view in

side elevation partly broken away, but showing the two parts in different relative positions from those shown in Fig. 1; and Fig. 3 is a perspective view of the hinge end of the front or forepart of the last.

The last is made in two parts, the forepart A being divided partly through from the hinge end toward the toe T by a slot *a* so as to provide an instep block B and a forepart body C containing the ball of the last and extending back of the waist at the hollow of the foot, the instep block B connecting integrally with the toe T by a straight-grained portion *a'* of the solid unsevered wood of the last. The separate heel-part H is connected to the forepart by any usual or preferred means, so long as the main features of my invention as set forth in the following claims are embodied in the last, inasmuch as I regard my invention as broadly new in the prominent features previously mentioned in the introductory part of this description, irrespective of whatever variations may be resorted to as to other details or structural features of the last.

In the last of the drawings, the heel-part H is joined to the forepart by a knuckle joint. A hinge plate *h*, setting into a saw kerf cut vertically in the heel-part and in the forepart, is secured by pins or rivets *b, c*, in the heel-part and by a pivot pin *d* in the body portion of the forepart. The hinge plate *h* is provided with a curved slot *e* in that portion of said plate which extends into a vertical kerf *k* provided in the rear end of the instep block B of the forepart, and a pin *f* passes through said rear end of the instep block B and said slot *e* of the hinge plate *h*. This curved slot *e* is so shaped that when the pin *f* is at the outer end of said slot as shown in Fig. 1, the pin is engaged by both sides of the slot which extends in a general direction transverse to the radius from the pivot *d* to said pin *f*, so that the instep block is thereby positively locked immovably in its full-waist position so that the last is held in its true full-waist shoe-filling condition for stretching or shaping a shoe upper to the exact measurements which the finished shoe is intended to have. This in one means, and the preferred means, of carrying out the principal feature of my invention, whereby, when the last is not in lengthened position with its heel-part down as shown in Fig. 1, the waist measurements of the forepart of the last may be and are reduced, but when the last is in lengthened position with its heel-part down as shown in Fig. 1, the last at the waist portion of the forepart is in full-waist shoe-filling position and is compelled to assume this position with absolute accuracy and uniformity under all conditions and so to remain as long as the last is in lengthened position, for it will be obvious that no amount of rubbing, freezing, or other

external pressure on the shoe can change the position of the instep block or reduce the full-waist measurements of the last, because my construction positively holds the parts of the last in this unvarying position. The preferred means for accomplishing this consists of the slotted plate and pin mechanism described. To assure this unvarying relation of the parts and prevent disturbing it by an accidental movement of the heel-part, I preferably employ a further locking device, that herein shown consisting of a button or latch *m* pivoted to the rear vertical wall W of the instep block B in position to fit tightly in a notch *n* which is cut into the top edge of the hinge plate *h* in position to receive said latch when the last is in fully lengthened position. This latch is turned down by the operator into said notch, and is desirable when the last is used for lasting as it prevents the heel-part from collapsing and bending while the operator is using it.

The rear portion of the slot *e* is made wider back of the point *e'* to the point *e''* so that the required movements of the instep block shall not be obstructed and said slot is closed at its outer end to give strength. The lower wall of said curved slot *e* is eccentric or cam shaped with reference to the pivot pin *d* on which the forepart and heel-part relatively turn, and the radial distance from the center of said pin *d* to the point *e'* on the curve of said lower wall is greater than the radial distance from the center of said pin *d* to the point *e''*, and when the last is straightened to the position shown in Fig. 1 some portion of the lower surface of the curved slot *e* between the point *e'* and the point *e''* bears against the point *f* and holds the rear end of the instep block B in the full-waist position already described, positively spread from the rear end of the ball part or body portion C of the last. When the last is bent to the position shown in Fig. 2 the pin *f* passes to some point back of the point *e'* and allows the rear part of the instep block B to close toward the body portion C of the forepart and the closure is brought about by the spring action of the unsevered portion *a'* that unites the instep block and the toe-part T together, in the construction shown in Fig. 2. The unsevered instep block connected with the toe-part in the way described, is constructed by forming the last and block together in the first instance, and sawing a thin strip of wood that is shaped somewhat like the half of a crescent from between the upper and lower parts, and this leaves the entire upper surface of the last smooth, and produces a last with only two parts of wood and practically with only two parts, united of course by the necessary hinge plate, and hinge pins which hold the plate in place.

In use, the last is first moved to shortened

position, with the waist measurements reduced by having the instep block and body portion of the forepart toward each other as shown in Fig. 2, and the last is then placed by hand in the shoe. If the last is being used in connection with the manufacture of turn shoes, the operator, before turning the heel-part H down into the heel of the shoe, runs his smoothing knife all around the forepart in the space which the collapsing of the forepart leaves between the instep block and the vamp or upper. Having smoothed out all the wrinkles from the upper in this manner, he turns the heel-part of the last down into the heel of the shoe. This movement permits the forepart to come to its fully expanded, full-waist measurements, in which position the instep block is immovably locked automatically by the operation of the pin *f* and the narrow forward end of the slot *e*, as shown in Fig. 1, and is further locked by the locking device *m*, when this preferred construction is used. The shoe manufacturer then proceeds with no danger whatever of any yielding or changing of the last measurements at any point. The last is strong, durable, stable and easily operated. These lasts, although specially useful in the manufacture of turn shoes, are adapted to general use. I have mentioned the manufacture of turn shoes because these lasts have proved of the most service in that connection, where it is essential that the uppers shall be held smoothly and firmly distended at all points and especially about the instep and waist portion of the last.

The measurement about the instep and waist must remain uniform. I provide means for restoring the last invariably to the same measurement every time it is extended, and for maintaining said uniform measurement under all conditions irrespective of external handling or pressure, and this is the main feature of my invention irrespective of whatever other variations or changes in the construction or kind of last may be resorted to. The reason for changing the waist measurement, *i. e.*, for contracting the forepart, is to enable the forepart to be inserted into or removed from a shoe, it being necessary to contract or decrease the measurement of the last at this point in order to permit the upper leather of the shoe to accommodate itself to the larger ball measurements of the last, and my invention provides means for automatically accomplishing this contracting of the waist measurements of the last and restoring said measurement to full-waist position in connection with the shortening and lengthening of the last when the heel-part moves with relation to the forepart.

In the old-fashioned block last, the operator simply pulled out the removable instep

block to contract the waist measurement of the last and simply shoved the instep block back into the last to restore the last to non-contractible full-waist measurement, and one feature of my invention, broadly considered, resides in accomplishing the same ends automatically. Accordingly I wish it definitely understood that, although I have herein set forth one embodiment of my invention in a complete last structure, to wit, in the swinging variety of divided or multi-part lasts, and in that variety in which the instep block gets its contracting and expanding movement by swinging with relation to the body of the forepart, my invention is nevertheless not to be restricted, in the broader aspects of this part of the invention, to these forms of embodiment, but includes the application of this part of the invention to any and all kinds of shortening and lengthening lasts to which it is capable of being applied, and is therefore not restricted, unless otherwise specifically stated in any particular claim, to a last whose parts are hinged to swing, connected to slide, or otherwise. Wherever a forepart and heel-part are transversely separated and provided with connecting means permitting shortening and lengthening movement, and the forepart has a movable instep block, and means cooperating with the lengthening movement of the last to move the instep block from contracted waist position to full-waist position and to lock the last thus *i. e.*, in shoe-filling position, I consider that it comes within the spirit and scope of my invention.

In further explanation, I prefer to make the forward narrow portion or end of the slot *e* concentric to the pivot *d*, approximately to the point *e'*, thereby permitting the heel-part to be turned partially out of the heel-part of the shoe before the collapsing movement of the instep block B. It will be understood that when the last is in a shoe, in the position shown in Fig. 1, considerable pressure is required to start the heel-part of the shoe, preparatory to removing the last, but that when once started it moves more freely. The shape of the forward portion of the slot *e* permits all the initial pressure to be devoted to starting the heel-part. The hinge plate is approximately square at its rear end or at least extends rearwardly and backwardly sufficiently to permit the rivet *b* to be located in from the front beveled face of the heel-part a considerable distance, and up from the curved contacting surfaces of the knuckle or rear lower end of the forepart a still greater distance, the pin *c* being located in the lower rear corner of said plate in a line with pivot *d* approximately parallel to the bottom of the heel-part, the result of this construction being that great strength is obtained for resisting leveling pressures, etc., the plane of

cut of the beveled front end of the heel-part also cooperating to this end, said plane being approximately long and preferably slightly forward of a radius from the pivot *d* to the forward upper corner of the heel-part. The result is that there is a considerable thickness of heel-part wood forward of the plane including the two pins *b*, *d*, and likewise between said pins. The breaking strain (such as occurs under the leveler, for instance) comes in the direct line of the plane last mentioned, and, therefore, it will be obvious that my construction gives great resisting strength, due to the location of the rivet *b* and the pin *c* with relation to the pivot *d*, taken in connection with the overhanging shape or forwardly extending portion of the heel-part. I have already mentioned also that the saw cut or slot *a* terminates at a point which leaves a straight-grained portion *a'* for connecting the lower integral end of the instep block with the rest of the forepart, and a further feature of said slot *a* resides in locating the same sufficiently high and on a proper curve to provide a thick heavy lower body portion C of the forepart, especially at the waist at the rear of the ball of the last, the curvature and location of the slot *a* following along and slightly above the widest or most laterally extended portion of the last on the inside thereof. This also restricts all the up-and-down stretching movement to the top side of the forepart and of the vamp, and it prevents interference with the style of the shoe, due to the movement of the block, and it avoids having the cut at or intersecting a protuberance of the last (such, for instance, as the toe joint).

It will be understood that many features of my invention are not restricted to the kind of hinged last shown, but may be used with various kinds of hinged, and divided, or multi-part lasts. I do not claim to be the inventor of the collapsible hinged last broadly considered (said invention belonging to Charles F. Pym, Patent No. 673,889), but my claims relate to the improvements, hereinafter more particularly specified, and also pointed out in general terms above, for perfecting such a last to meet all the exacting requirements of use and making it commercially practicable and durable. It will at once be seen that, by my construction, an expanded last cannot be collapsed by any usual pressure upon the instep block, the latter cannot be externally shifted in any direction or to any extent whatever, the heel-part likewise maintains its proper operative position at all times, and on the other hand when the last is collapsed it tends to remain collapsed as long as desired, for removal from the shoe or for insertion therein, and the last, moreover, is not only extremely stable, but likewise strong, has a smooth exter-

nal surface, and cannot readily shift its parts or get out of position. In other words, the object of my invention is to make this kind of a last strong, durable, and unyielding in use, like a solid block-last, and yet retain the advantages of the collapsible last.

What I claim is:—

1. A trans-versely divided last, comprising a heel-part, a separate fore-part having an instep block integrally connected at its lower forward end to the wood of the remaining portion of the fore-part, and a connecting device connecting said heel-part and fore-part and providing for a longitudinal abutting lengthened position of said heel-part and fore-part and a relatively vertical movement for shortened position, said last having provision for contracting said instep block as the last shortens by the said relatively vertical movement of said heel-part and fore-part.

2. A hinged last, comprising a heel-part, a separate fore-part having an instep block integrally connected at its lower forward end to the wood of the remaining portion of the fore-part, and a hinging device rigidly connected to the heel-part, pivoted to the rear lower end of the fore-part and provided with means cooperating with the instep block in the contraction of the latter as the shortening swing of the heel-part takes place.

3. A last, comprising a trans-versely divided fore-part and heel-part, and permanent connections for shortening and lengthening the last by movement of the heel-part in a vertical plane, said fore-part being provided with an instep block having a narrow integral connection therewith at its forward lower end extending longitudinally of the grain of the wood, said instep block being raised when the last parts are in lengthened position, the aforesaid construction including provision for automatically contracting said raised fore-part as the last shortens.

4. A last, comprising a fore-part and heel-part transversely separated, connecting means permitting the shortening and lengthening of the last by movement of the heel-part in a vertical plane, the said fore-part having a vertically movable instep block, means for rendering said last durable and stable, consisting of an integral connection between the lower forward end of the instep block and the rest of the fore-part affording a strong resistance against movement from normal position, and means for positively holding said instep block and heel-part against tendency to shift from their extreme positions toward an opposite position when the last is fully lengthened and fully shortened.

5. A last, comprising a fore-part and heel-part transversely separated, connecting means permitting the shortening and lengthening of the last by movement of the heel-

part in a vertical plane, said fore-part having a vertically movable instep block, means for rendering said last durable and stable, consisting of an integral connection between the lower forward end of the instep block and the rest of the fore-part affording a strong resistance against movement from normal position, and means for positively locking and bracing the rear end of said instep block in expanded position.

6. A last, comprising a fore-part and heel-part transversely separated, connecting means permitting the shortening and lengthening of the last by movement of the heel-part in a vertical plane, said fore-part having a vertically movable instep block, means for rendering said last durable and stable, consisting of an integral connection between the lower forward end of the instep block and the rest of the fore-part affording a strong resistance against movement from normal position, means for positively locking and bracing the rear end of said instep block in expanded position, and means for maintaining said instep block and the rear end of the rest of the fore-part against possible movement away from each other when in contracted position.

7. A last, comprising a fore-part and heel-part transversely separated, and connecting means permitting shortening and lengthening movement, said fore-part having a movable instep block, and means operated by the lengthening movement of the last for locking said instep block in full-waist shoe-filling position.

8. A last, comprising a fore-part and heel-part transversely separated, constructed and arranged to move relatively to each other in a vertical plane for shortening and lengthening, said fore-part having a movable instep block, connecting means between said fore-part and heel-part permitting said lengthening movement, and automatic means for insuring the movement of the fore-part and its instep block to the same full-waist measurements each time the last is moved to lengthened position.

9. A last, comprising a contractible fore-part and swinging heel-part, connecting means permitting said swinging movement, and automatic means for insuring the movement of the fore-part to the same distended measurements each time the last is moved to lengthened position.

10. A last, comprising a fore-part having a vertically movable instep block, and a heel-part transversely separated from, and pivoted to, said fore-part to swing into shortened and lengthened position, combined with internal means operated by said swinging movement for preventing external shifting of the instep block in any direction when the last is in operative distended position in a shoe.

11. A last, comprising a transversely separated fore-part and heel-part connected to shorten and lengthen by movement of the heel-part in a vertical plane relatively to the fore-part, said fore-part having a relatively movable instep block and being capable of contraction and expansion in a vertical direction as the heel-part is moved relatively to said fore-part, said last having provision for preventing the expansion of the fore-part when it is contracted.

12. A last, comprising a fore-part and heel-part transversely separated, and connecting means permitting the shortening and lengthening of the last by movement of the heel-part in a vertical plane, said fore-part having a vertically movable instep block swinging on its toe-end into full-waist shoe-filling position and into contracted-waist shoe-releasing position, and automatic means for holding said instep block against movement from contracted-waist position to full-waist position when said heel-part is in last-shortened position.

13. A last, comprising a heel-part, a fore-part having a vertically swinging instep block, a hinge connection pivotally connecting said fore-part and heel-part and having an extension permanently united with said block, and a locking means arranged to positively hold the parts from turning on the hinge connection.

14. A last, comprising a heel-part, a divided fore-part hinged thereto, the hinge pivot therefor, a pin in the rear upper portion of the fore-part and a projection moving with the heel-part and engaging said pin, the engaging surface thereof extending in approximately the direction of swinging movement and being deflected toward the pivot at its rear end.

15. A hinged last, comprising a heel-part and a divided fore-part, and an approximately horizontal projection movable with one part to engage the other part, and having a slightly eccentric engaging edge.

16. A hinged last, comprising a heel-part and divided fore-part, a hinge pivotally connecting them, the hinge pivot, and a projection extending from said hinge in engagement with the upper portion of the fore-part and provided on its under side with an eccentric edge movable with relation to the point of said engagement as the last is shortened.

17. A last, comprising a divided fore-part, a heel-part connected to the fore-part to move upwardly to shortened position and downwardly to lengthened position, and provision for vertically contracting said fore-part as the heel-part moves to said shortened position, including means permitting the initial shortening movement of said heel-part independently of said contracting movement.

18. A last, comprising a divided fore-part

having a full-waist position and contracted-waist position, a heel-part connected to the fore-part to move upwardly to shortened position and downwardly to lengthened position, and means for locking the fore-part against movement to full-waist position when the last is shortened

19. A wooden last, comprising a heel-part separated from the fore-part along a line extending from the hollow of the foot to the crown next the instep so as to render the heel-part movable, when within the shoe, from lengthened to shortened position; and a transversely-longitudinally slotted solid fore-part movably and permanently connected to said heel-part, the dividing slot of the wooden fore-part extending forwardly and downwardly in a curved line along or above the portion of the last corresponding to the widest or most laterally extended portion of the foot viewed on the inside thereof.

20. A wooden last, comprising a heel-part separated from the fore-part along a line extending from the hollow of the foot to the crown next the instep so as to render the heel-part movable when within the shoe from lengthened to shortened position, and a transversely-longitudinally slotted solid fore-part movably and permanently connected to said heel-part, the upper and lower portions of said fore-part having integral connection with each other at the toe lengthwise of the grain of the wood, said integral connection and grain of the wood tending to maintain said upper portion of the fore-part in extreme position, the dividing slot of the fore-part extending forwardly and downwardly in a curved line along or above the widest or most laterally extended portion of the last viewed on the inside thereof.

21. A last, comprising a heel-part, a solid wooden fore-part separated therefrom by a line of cut providing a transverse V-shaped opening between the upper portions of said two last-parts, said fore-part being hinged

to the heel-part and containing a transverse-longitudinal slot separating the fore-part into an upper instep portion and a lower portion, the rear end of the latter extending rearwardly of the rear end of the instep portion to a point back of the waist of the last and containing all the wood of the last, integral and uncut, below that plane or line of the last which corresponds to the greatest width or most laterally extended portion of the last viewed on the inside thereof.

22. A last, comprising a wooden heel-part, a solid wooden fore-part separated therefrom by a line of cut providing a transverse V-shaped opening between the upper portions of said two last-parts, and a hinge-plate pivotally joining said fore-part and heel-part having approximately rectangular upper and lower rear corners and extending across said opening into the fore-part, the heel-part and fore-part containing vertical kerfs for said hinge-plate, and transverse retaining pins located in the heel-part in said two corners of the hinge-plate and in the fore-part in the forward lower corner of the hinge-plate, the forward upper end of the heel-part which constitutes the rear wall of said V-shaped opening being located forward of the radial plane which includes the fore-part retaining pin and the upper forward corner of the heel-part.

23. A last, having its fore-part and heel-part formed with a V-shaped notch in the upper side and concavo-convex surfaces below said notch, pivotally connected, and a lock in the form of a flat plate mounted to slide on the inner end of one last-part, and a notch for receiving said plate in the other last-part.

In testimony whereof, I sign this specification in the presence of two witnesses.

EDWIN O. KRENTLER.

Witnesses:

MAY E. KOTT.

CHARLES F. BURTON.