

E. O. & W. A. KRENTLER.
AUTOMATICALLY LOCKING LAST.
APPLICATION FILED DEC. 16, 1908.

999,504.

Patented Aug. 1, 1911.

2 SHEETS—SHEET 1.

Fig. 1.

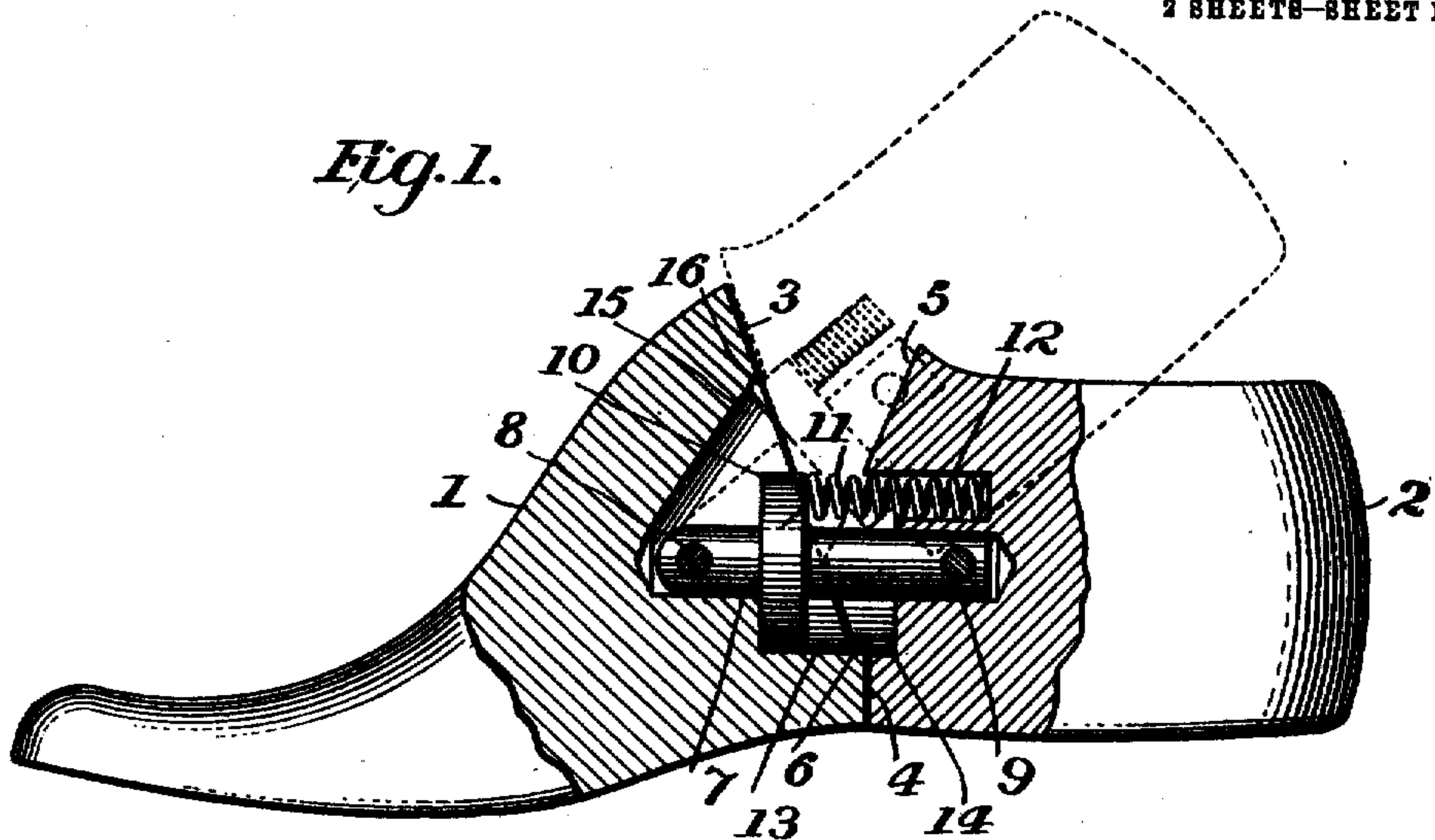


Fig. 2.

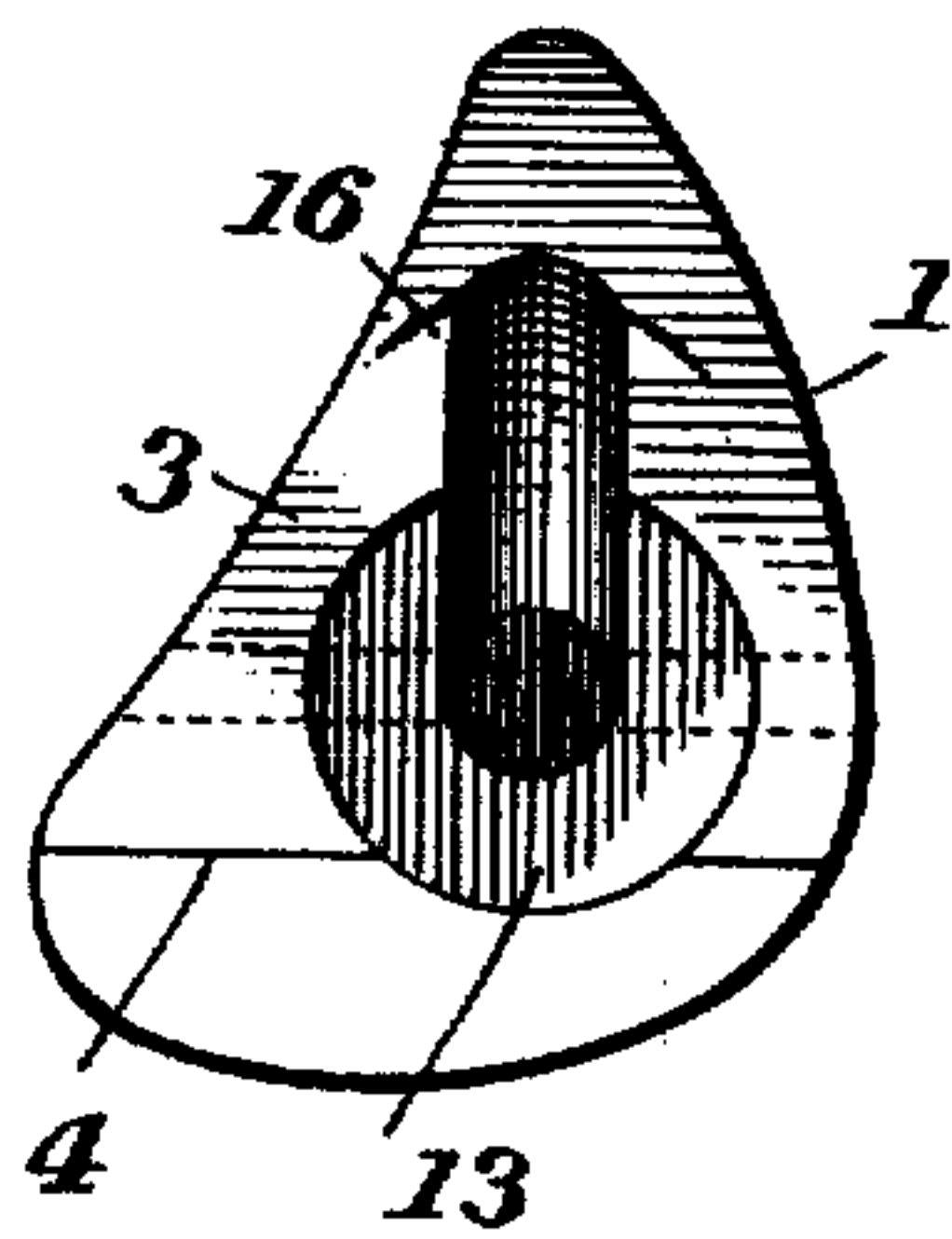
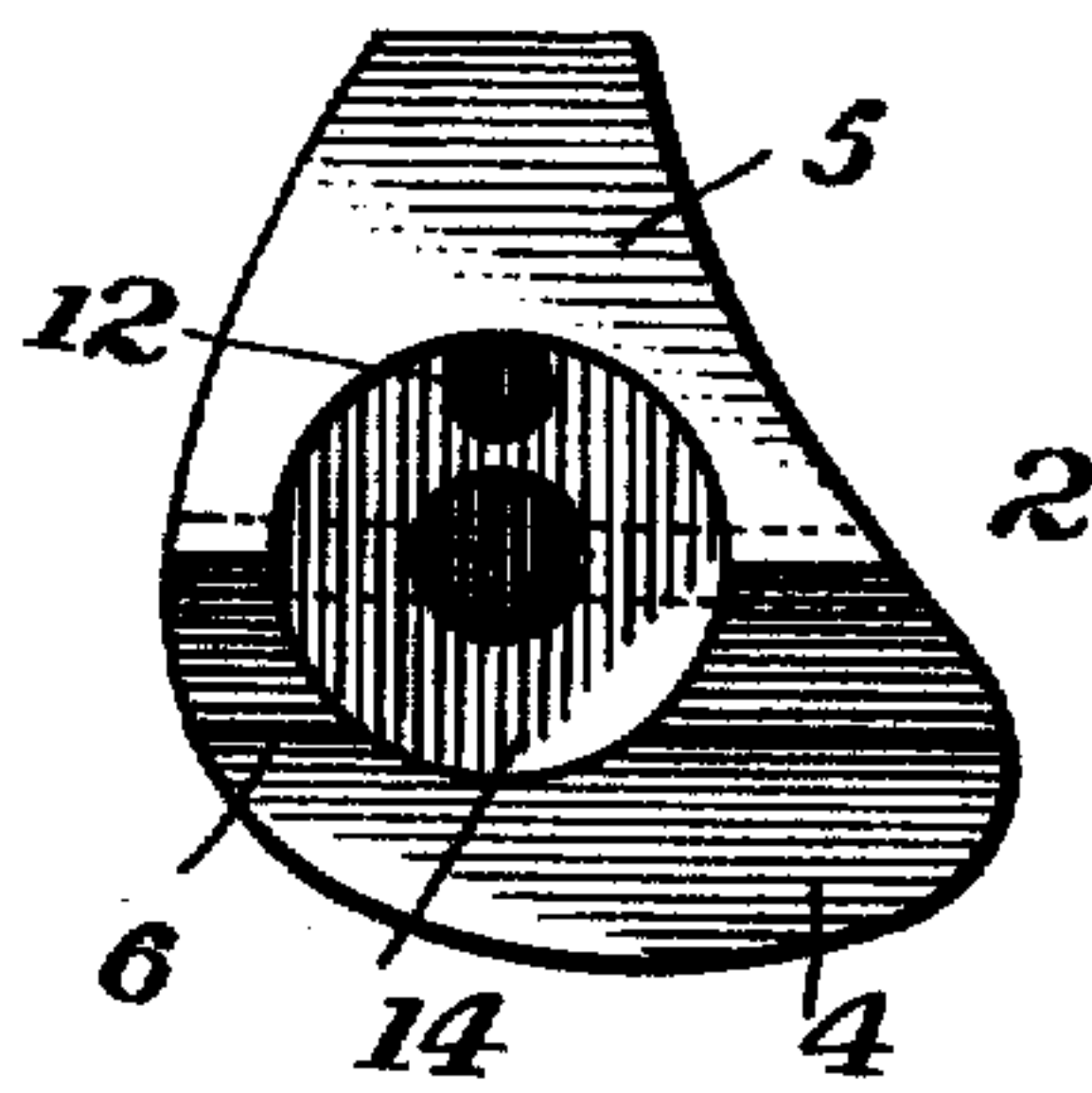


Fig. 3.



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2 SHEETS—SHEET 2.

Fig. 4

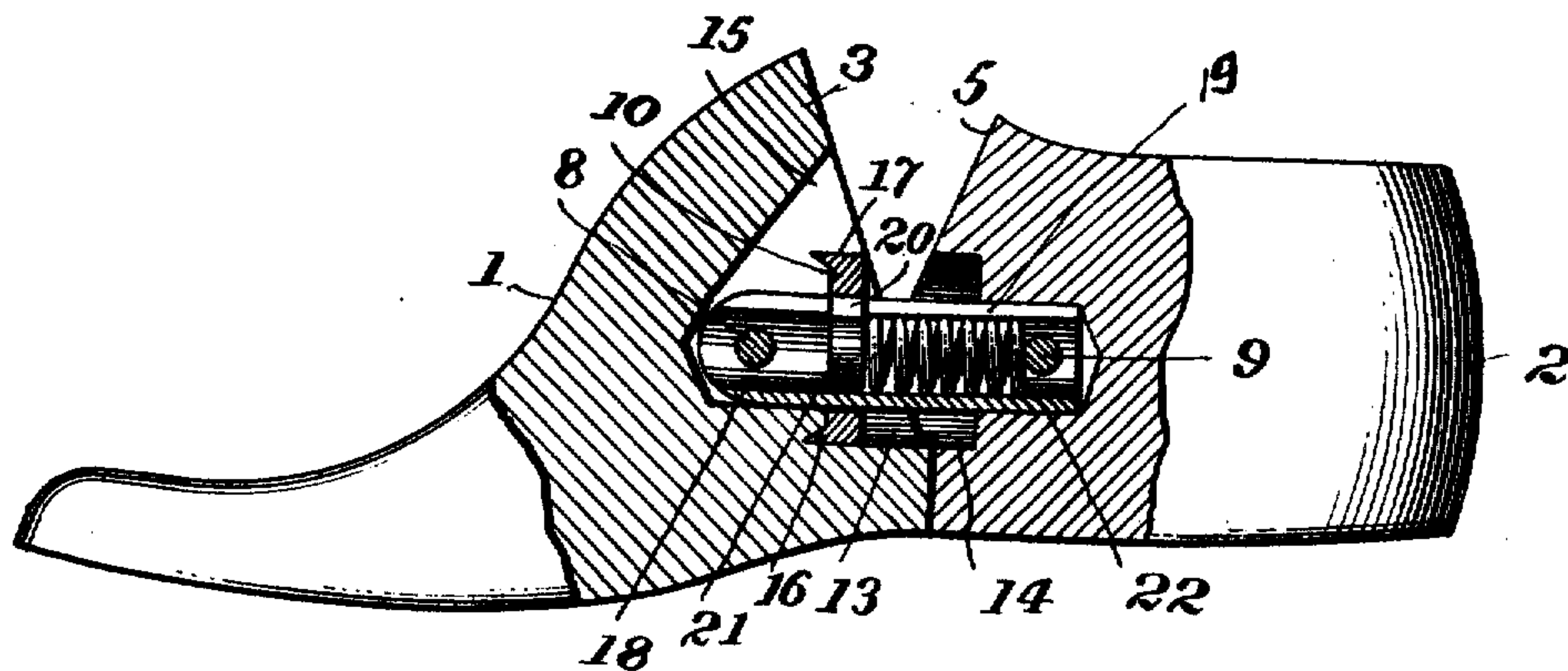
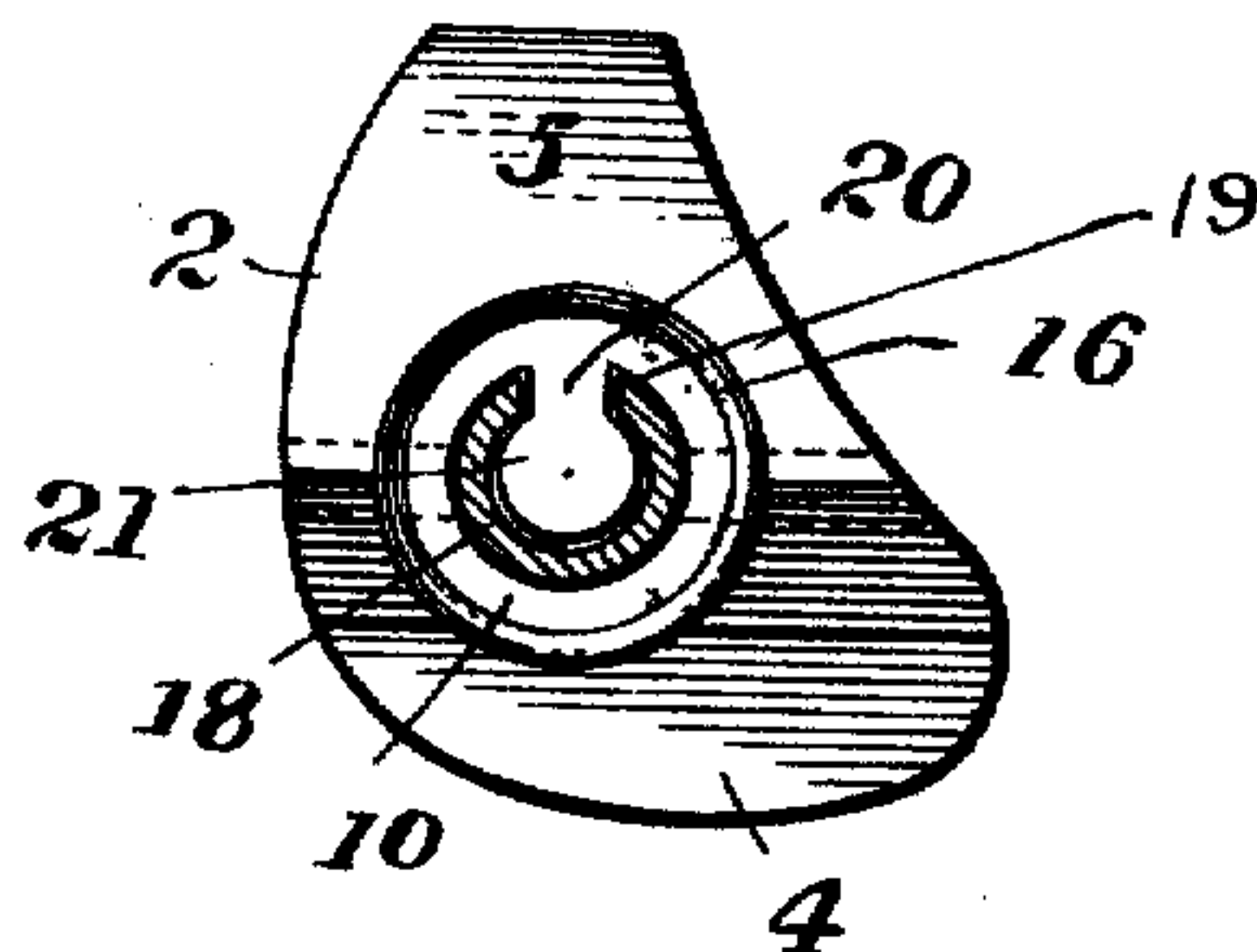


Fig. 5



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UNITED STATES PATENT OFFICE

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AUTOMATICALLY-LOCKING LAST.

999,504.

Specification of Letters Patent.

Patented Aug. 1, 1911.

Application filed December 16, 1908. Serial No. 467,766.

To all whom it may concern:

Be it known that we, EDWIN O. KRENTLER and WALTER A. KRENTLER, citizens of the United States, and residents of Detroit, in the county of Wayne and State of Michigan, have invented an Improvement in Automatically-Locking Lasts, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

Our invention, although adapted to all sizes and kinds of hinged or divided lasts is particularly intended for a child's last. A child's last is necessarily so small that it is unable to withstand the strains and pressures brought to bear upon it when constructed in the ordinary manner, and accordingly presents many special difficulties, both in manufacture and in use. The ordinary construction of a hinged or divided last requires that a considerable portion of the internal wood shall be cut away in order to receive the last-parts and permit of their proper working, and our present invention aims to secure the necessary movements and articulated construction without cutting away the wood or weakening the last. On the contrary, the last constructed according to our invention is much stronger than the usual hinged last, and yet is suitable for a child's last.

In general the main feature of our invention resides in providing a connecting bar of such shape as to receive or support a locking plate or member capable of moving from locking position in a shallow recess in the face of one last part back into a similar shallow recess in the face of the other last part, so as to permit the last-parts to turn on each other, said locking piece being preferably in the form of a disk mounted to slide on the hinge or connecting union which joins the two last-parts, and so constructed and positioned that when in the recess in one last-part in locking position it has a vertical thrust against the walls of the recess, which prevents the last-part from swinging upwardly. Also in the preferred embodiment of our invention the construction is such that the heel-part is held up when the last is collapsed.

In the drawings, Figure 1 shows a last in

side elevation with the side broken out so as to show the construction at the joint portion of the last in vertical section; Figs. 2 and 3 are views in elevation of the secant ends of the opposite last-parts with the connecting and locking devices removed; and Figs. 4 and 5 are views, in broken side elevation and transverse section respectively, of a still more complete embodiment of the invention.

The forepart 1 and heel-part 2 of the last may be of any usual construction, being herein shown as separated by lines of cut 3, 4, 5 which provide a jog or shoulder 6 and a gap or V-shaped opening between the parts 5 and 3 to permit the desired hinging or swinging movement of the last. The connecting device is herein shown as a rod 7 pivoted at 8 in the forepart and secured by a transverse rivet or pin 9 in the heel-part. On this hinge or union is mounted a disk 10 normally held forward by a spring 11 housed in the heel-part, shown in Fig. 1 as in a hole or recess 12. The forepart and heel-part are provided with substantially similar recesses 13, 14 respectively corresponding to the shape and size of the locking plate or disk 10. A narrow slot 15 is provided to permit the connecting pin or hinge 7 to swing upwardly as the heel-part swings from its full line position, Fig. 1 to its dotted line position.

In Figs. 4 and 5 the disk has a horizontally extending annular flange or knife edge 16 which fits a corresponding thin annular cut or recess 17 in the forepart, and which constitutes an extension of the recess 13, whereby the disk or abutment 10 is given increased locking surface without cutting away so much of the wood as in Figs. 1 and 2. The connecting bond or union, instead of being solid, is made hollow as shown at 18 and provided, preferably at one side, with a slot 19 to receive the neck 20 of a head or tongue 21 of the washer or disk 10 which constitutes the locking abutment or member. Against the back side of this tongue 21 is a spring 22 housed within the hollow rod or hinge member 18. This construction is more compact than the preceding (although each has its advantages) and is stronger in some respects. Neither the wood of the forepart nor of the heel-part

is cut away as much in Fig. 4 as in Fig. 1. The flange 16 gives exceedingly strong locking resistance, resisting collapsing movement throughout practically its entire extent, instead of merely its upper half as in Fig. 1, inasmuch as the inner surface of the lower part of said flange 16 pulls upwardly against the overhanging surface of the lower part of the recess 17, when collapsing pressure is applied to the heel-part. In other words the flange or knife edge 16 is engaged at all points throughout its length by longitudinal surfaces of the wood on the opposite sides of said knife edge and said engagement enables the latter to exert both a pull and a push against the wood. The construction of Figs. 4 and 5 also avoids the necessity of boring the heel-part at 12, as the spring is inside of the hinge rod. Also less metal is required for the parts.

In use, when the last is in lengthened position as shown in full lines in Fig. 1, the locking member 10 occupies the recess 13 in the forepart, thereby holding the two last-parts 1, 2, in rigid lengthened position; any compression strains upon the last creating a tendency to swinging or collapsing of either part relatively to the other part are transmitted from the rod 7 to the locking disk 10 as lateral stresses, which are resisted by the contacting upper walls of the recess 13, the disk or locking member 10 thus constituting a compression strut or brace. In the form shown in Fig. 4 the lower portions of the flange 16 likewise cooperate in resisting the lateral stresses due to such compression strains. Also, as said locking member 10 and its flange engages the walls of the recess 13 throughout its entire periphery, said parts cooperate to hold the last rigidly against movement in any direction whatever, sidewise as well as up or down. When the last is to be collapsed, the operator inserts a suitable tool, like a small screw-driver or pin, in front of the locking member 10 and pries or shoves back said locking member into the recess 14, and turns up the heel-part against the forepart on its pivot 8. The spring 11 presses the upper forward corner of the locking member against the adjacent secant wall of the forepart, which serves to hold the heel-part frictionally in raised position. If desired, this holding movement may be made positive and certain simply by forming a slight depression 23 in the forepart or otherwise causing the locking member 10 and wall of the forepart to interlock sufficiently to retain the last-parts collapsed. With the knife-edge construction (Fig. 4) the parts are held sufficiently by friction. We prefer to have the locking recess and movement take place in the forepart rather than in the heel-part, but do not intend to restrict the invention thereto.

Not only is our construction strong but exceedingly cheap and easy to make. All that is necessary is to bore similar holes in the forepart and the heel-part with a suitably shaped tool to form the recesses shown in Figs. 2 and 3 and then cut out the vertical slot 15 from the forepart recess, (and in Figs. 1-3 provide a spring-retaining aperture 12 in the heel-part). Then the metal parts 7, 10, 11 are put in place and secured by the rivets 8, 9. Very little of the wood, it will be seen, is removed. The recesses 13, 14 are shallow and at the secant ends of the wood, so that they do not tend to weaken the last to any material extent, while the cylindrical portions for the pin 7 are small and in the center, being surrounded entirely by the integral wood, thereby affording the greatest strength. Besides the advantages already mentioned, our invention permits an extra long heel portion together with a full or long crown part, so that the latter is ready at all times to sustain the instep or lacing portion of the shoe while the former gives great strength to the heel, both of these features being of special value in children's lasts.

We prefer to make the locking member in the form of a disk, because thereby a perfect fit is most readily secured and the greatest strength is provided with the least expense of fitting, removal of wood, etc., but it will be understood that we are not limited in this respect, and also that while we prefer that the locking member shall slide rather than swing or tip on the pin 7, we are not limited thereto, inasmuch as the locking feature (considered aside from the other functional advantages) resides simply in interposing a block, strut, or wedge between the hinge and an overhanging shoulder such as the upper overhanging wall of the recess 13 and making said locking part movable into engagement with said shoulder for locking the last and out of engagement therewith for unlocking the last. By our invention the hinge may be said to be anchored at its middle or tied at its middle to the wood, when locked, being tied and braced in all radial directions. The flange 16 constitutes a tension brace or strut and also a compression brace, each of which features is new. Also, while we prefer to employ as the hinge a round rod for the reason that it avoids the necessity of cutting away the wood and thereby leaves the last that much stronger, yet, excepting as otherwise specified in the claims, we are not limited thereto. Great strength of union is possible with a comparatively light rod 7 because of the heavy rigid bracing thereof approximately at its middle portion by the disk or other-shaped locking member 10. We prefer to employ a spring for holding the locking member 10 normally forward, as thereby we secure easy move-

ment for locking purposes and also the best holding results for holding the last-parts in collapsed position, but it will be understood that we are not restricted to this construction and arrangement.

We believe that our invention is broadly new in a number of respects, especially in providing a locking member which resists movement in all transverse directions alike and in providing a locking member which braces vertically between the hinge and the adjacent portion of a last-part.

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

1. A hinged last, comprising a forepart, heel-part, and hinge connection permitting said last parts to move from lengthened to collapsed position, one of said last parts having an overhanging shoulder, and a locking device movable into locking engagement between and with said shoulder and hinge connection for locking the last in lengthened position.

2. A hinged last, comprising a forepart, heel-part, hinge connection, and a locking device carried by said hinge connection, the adjacent part of the last having a recess above said connection into which said locking device is movable and then constitutes a compression strut for locking the last lengthened.

3. A hinged last, comprising a forepart, heel-part, hinge connection, a locking device carried by said hinge connection, the adjacent part of the last having a recess into which said locking device is movable to constitute a compression strut between the recess and hinge connection for locking the last lengthened, and a spring normally tending to move the locking device into said recess.

4. A hinged last, comprising a forepart, heel-part, a hinge connection pivoted in said forepart, and a locking device movably supported on said connection, said forepart having in its secant face a recess, and said locking device fitting and bracing snugly against the walls of said recess for holding the last in lengthened position.

5. A hinged last, comprising a forepart, a heel-part, a hinge connection therefor, and a locking device in the form of an annular tension brace capable of anchoring the middle part of said hinge connection immovably with relation to the wood of the last when the last-parts are in lengthened position.

6. A hinged last, comprising a forepart, a heel-part, a hinge connection therefor, and a locking device carried by said hinge connection in the form of a compression brace capable of anchoring the middle part of said hinge connection immovably with relation to the wood of the last when the last-parts are in lengthened position.

7. A hinged last, comprising a forepart, a heel-part, a hinge connection therefor, and a locking device having anchoring portions capable of anchoring the middle of said hinge connection against movement in any transverse direction.

8. A hinged last, comprising a forepart, a heel-part, a hinge connection therefor, and a locking device connected with the middle of said hinge connection having portions adapted to engage the adjacent part of the last to resist pulling strains on said middle and other portions to resist pressing strains on said middle, for anchoring the hinge immovably at its said middle when the last-parts are in lengthened position.

9. A hinged last, having its forepart and heel-part pivotally connected, and a locking device, including a ring-like member movable longitudinally of the last into interlocked position with one of the last-parts for locking the last lengthened.

10. A hinged last, comprising a forepart and heel-part, a rod extending longitudinally of the last and pivotally connecting said last parts, a locking block mounted to slide on said rod, the adjacent last part containing a recess in its secant face to receive said block for locking the last in lengthened position.

11. A hinged last, comprising a forepart, a heel-part, a union pivotally connecting them, said last parts having recesses in their opposite secant faces, and a locking block movable into one of said recesses into bracing position between said union and the overhanging wall of the recess for locking the last lengthened, and movable into the other of said recesses for permitting the last to collapse.

12. A hinged last, comprising a forepart, a heel-part, a union pivotally connecting them, said last parts having recesses in their opposite secant faces, a locking block movable into one of said recesses into bracing position between said union and the overhanging wall of the recess for locking the last lengthened, and movable into the other of said recesses for permitting the last to collapse, and a spring normally tending to move said block into locking position.

13. A hinged last, comprising a forepart and heel-part, a union pivotally connecting said parts, a locking member movable on said union to lock the last in lengthened position, and a spring cooperating with said locking member to hold the last also in collapsed position.

14. In a hinged last, a forepart and heel-part, a rod pivotally joining said parts, and a locking block slidably mounted on said rod, said forepart and heel-part having similar central longitudinal holes snugly receiving said rod and similar recesses corresponding in shape to said block, the fore-

part having a vertical slot, opening from said hole, to permit the swinging of said rod on its pivot in the forepart.

15 In a hinged last, a forepart and heel-part, a tube extending longitudinally of the last for joining said last-parts, a member movable on said tube into locking engagement with one of said last-parts, and an actuating spring for said locking member
10 mounted within said tube.

16. In a hinged last, a forepart and heel-part, a slotted tubular connection joining said last-parts, a locking member mounted to move on said connection having a tongue-like part extending in the slot of said connection, and a spring within said tubular connection engaging said tongue-like part for normally holding the locking member in locking position.
15

20 17. In a hinged last, a forepart and heel-part, and a tubular connection joining said last parts, a longitudinal hole in each last

part for receiving the adjacent end of said tubular connection, there being a recess in one of said last-parts about said hole therein, means associated with said tubular connection, engageable with said recess to render the last-parts rigid, a fastener extending through one end of said connection and the adjacent wood of the last part and cooperating with the surrounding wood to hold said end of the connection immovable, and a transverse pin extending through the opposite end of said connection and wood of the adjacent last part to constitute a pivot
25
30
35 for said connection.

In testimony whereof, we have signed our names to this specification, in the presence of two subscribing witnesses.

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WALTER A. KRENTLER.

Witnesses:

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."