Sept. 15, 1953 C. H. HEITMAN ET AL 2,651,794

HINGE FOR SHOE LASTS

Filed Nov. 3, 1949

Fig. 1.

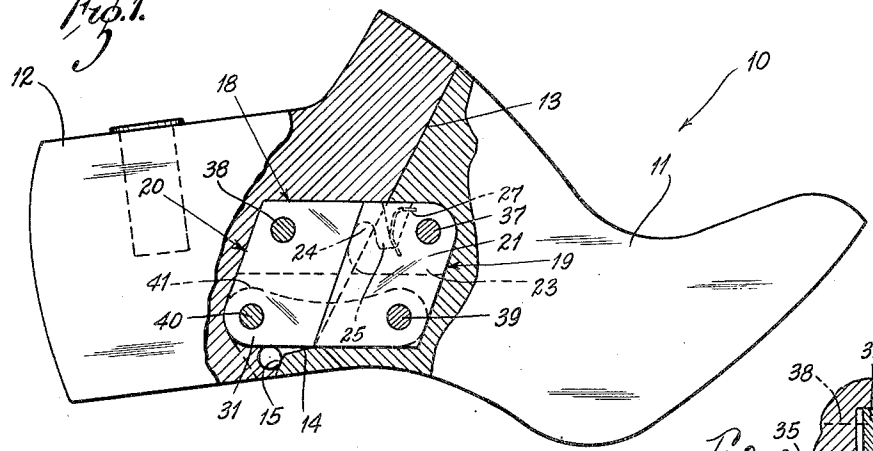

Fig. 2.

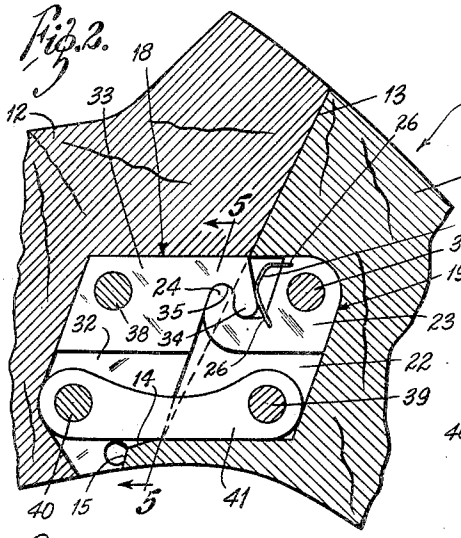

Fig. 3.

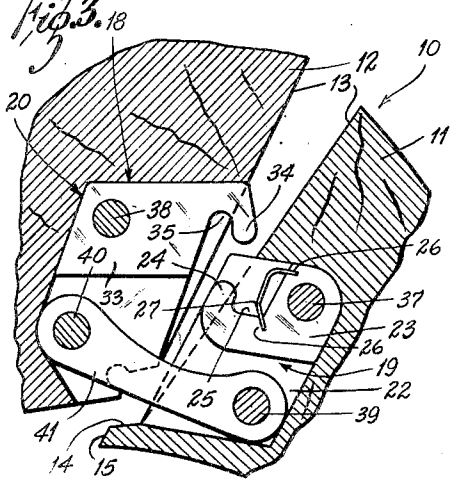

Fig. 5.

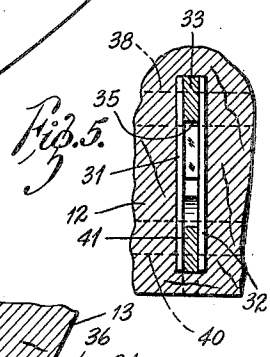

Fig. 4.

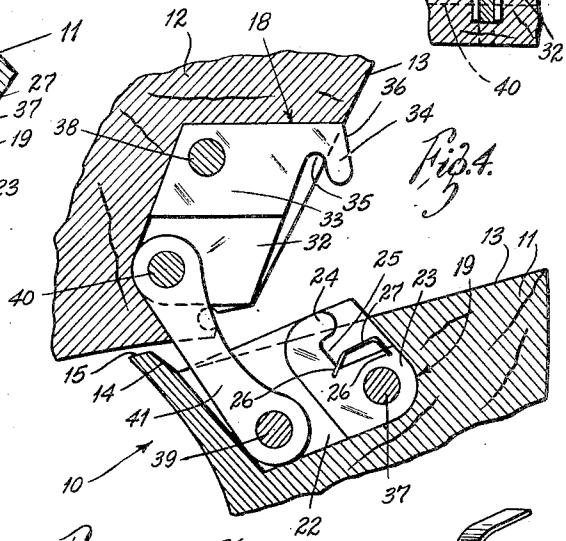

Fig. 6.

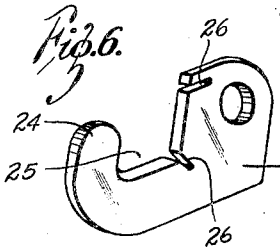

Fig. 7.

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Patented Sept. 15, 1953

2,651,794

UNITED STATES PATENT OFFICE

2,651,794

HINGE FOR SHOE LASTS

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Application November 3, 1949, Serial No. 125,212

12 Claims. (Cl. 12—136)

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The present invention relates to an improvement in a hinge for a shoe last, and in particular to an improvement in the locking means for such a hinge.

The applicant, Clarence H. Heitman, is the patentee in Patent No. 2,391,968 of January 1, 1946, and the present application is an improvement over the hinge set forth in that patent.

The present hinge last provides for the opening and closing of the last by vertical and pivoted movement of one last section relative to the other, so that the heel part of the last may clear the back line of the shoe upper when the last is broken. In the present design, the last is automatically self-locking when it is moved into position. This lock acts with a snap action, but it is releasable by a properly applied force.

The objects of the invention are to obtain those advantages previously set forth. Also, it is an object of the invention to provide a locking hinge last that consists in a small, compact unit, that is strong, dependable, and inexpensive; and that may be unlocked without excessive force but that will hold securely when locked. Particularly it is an object to provide such a hinge that has a spring means related to a hook type of hinge closing device so that the hook snaps into position and is firmly but releasably held closed.

In the drawings:

Fig. 1 is a side elevation of a last partly in section to show a side elevation of the hinge;

Fig. 2 is an enlarged medial fore-to-aft section of the center part of the last and the hinge;

Fig. 3 is a view similar to Fig. 2 but with the hinge partially open;

Fig. 4 is a view similar to Figs. 2 and 3, but with the last entirely open;

Fig. 5 is a transverse section taken on the line 5—5 of Fig. 2;

Fig. 6 is a perspective view of one of the hinge lock members; and

Fig. 7 is a perspective view of the lock spring.

The last, generally indicated at 10, has a toe section 11 and a heel section 12 of any familiar construction. These fore and aft last sections constitute a specialized application of the hinge of the present invention, representing as they do, two relatively movable but permanently connected elements that separate by a particular movement and join in a firm locking engagement for use. The two sections join in interfaces comprising an upper face 13, a ledge 14 and a lower face 15. The lower face is more or less parallel to the upper face 13. This type of

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last is well known in the art. It is designed to open by lifting the top forward part of the heel section 12 while the front last section 11 remains in the shoe.

The hinge is here generally indicated at 18. In the preferred construction, it is of laminated construction and includes a forward hinge section 19 and a rearward hinge section 20. The forward section 19 consists of two side plates 21 and 22, preferably of metal, and attached together about a spacer and hook member 23. These parts may be welded together or otherwise attached so that they are strong and rigid, the two side plates 21 and 22 being held in rigid parallelism by the spacer member 23. The spacer is disposed in the upper half of the side plates so as to provide a slot between the side plates 21 and 22 in the lower half of the hinge section.

The spacer member 23, which forms the middle lamination, is cut away to form a hook-like nose 24 at its upper forward end. This hook or nose 24 is formed in the upper quarter of the hinge section 19 by a recess 25 cut into that portion of the spacer 23. The top of the hook 24 is below the top of the front hinge section 19, to permit introduction of a companion hook into the recess 25 as will appear. The back edge of the recess has two slots 26 that receive the ends of a formed leaf spring 27. The nose of the hook member 24 is preferably made on a semi-circle, and the connecting part of the recess 25 is also made on a similar semi-circle, the two arcuate surfaces merging in a manner to enable them to be separated by upward movement of the rear section 12 along the interface 13 of the front section 11. The spring extends, as is indicated for example in Fig. 3, so that when released its lower bend is just about opposite the upper part of the overhang of the hook member, and below this bend the spring 27 recedes downwardly and backwardly. From the bend point, the spring extends upwardly, as is shown, and then bends generally horizontally into the slot 26, so that it will flex in a manner to be described and so that it is contained within the outer limits of the hinge section 19.

The rear hinge member 20 is likewise preferably of laminated construction, it having side plates 31 and 32 that are spaced by an intervening spacer member 33. The spacer 33 is disposed in the upper half of the hinge section 20, and, when it is welded or otherwise secured to the two side plates, the product is a rigid hinge section with a slot between the plates in the lower half of the section. The spacer 33 has a hook or

nose 34 that is formed by cutting a recess 35 from the edge of the spacer. The end of the nose 34 is preferably semicircular, and the connecting part of the recess edge is similarly arcuate, providing a slight undercut. These semicircles may be substantially the size of those on the companion hook member, but preferably are slightly smaller. The nose 34 projects beyond the interface edge of its hinge section 20 and its projecting edge 36 slopes backwardly, so that it may engage the recess 25 of the forward hinge section, the hook 24 of which forward section may end flush with the edge of its section 19.

The hinge 18 is attached in suitable recesses in the fore and aft portions of the last, which recesses are preferably close fitting to aid in having a tight hinge, and to aid in installing the hinge into the last. Suitable holes are provided through the hinge sections and the last to admit pins 37 and 38 through the upper parts of the fore and aft hinge portions 19 and 20 to partially secure the hinge portions to the last. When these pins are in place, the hinge sections are rather well secured, when the recesses in the last are close fitting. The lower parts of the hinge likewise have holes through them to receive pins 39 and 40, which likewise preferably pass through the last to insure that the hinge sections are securely held in the last sections.

The two pins 39 and 40 also connect the ends of a hinge link 41. This hinge link desirably is contained within the outer limits of the side plates of the two hinge sections and its bottom edge is coincident with the bottom edges of the two side plates and with the recess in the forward part of the last. Necessarily, the rear section of the last is cut away below the link 41 for permitting the last to be opened. The link is contained within the slot formed in the two hinge sections below the spacers 23 and 33 in the respective hinge sections 19 and 20.

The use of the hinge is as follows:

When the last is closed, the parts assume the positions indicated in Figs. 1 and 2. The nose 34 of the rear hinge section 20 is hooked into the recess 25 of the forward hinge section 19, and the nose 24 of the latter engages in the recess 35 back of the nose 34. This brings the interfaces of the last sections and the hinge sections together. In this position, the spring 27 bears against the nose 34 of the rear hinge section 21, and forces that nose against the nose 24 of the forward section. The nose 34 flexes the spring 27, distorting its lower bend upwardly so that the primary point of pressure comes on the sloping edge 36 of the nose 34, thus locking the nose 34 downwardly. On the other hand, the last may be broken by elevating the front part of the rear section 12 to separate the hooks, as shown in Fig. 3, and to completely open the last, as is shown in Fig. 4. The last is reclosed when the forward last section 11 is in the toe of the shoe, and the rear section 12 is open, with its back heel edge in the bottom of the heel of the shoe upper. Pressure is then exerted on the upper forward part of the rear section, to force it down into the shoe. The link defines the movement, and the last involves a sliding of the rear section 12 along the interface 13, with the hook 34 deforming the spring 27 as it engages in the recess 25, to become releasably locked as before, by the spring 27. As the drawing shows, the locking occurs with a snap action, as the spring or its equivalent spring-urged means, rides over the nose onto the sloping surface 36.

Preferably, the upper part of the forward hinge section 19 projects rearwardly from its last section 11 so that when the rear last section 20 descends as aforesaid, during closing of the last, the hook 34 will readily enter the projecting recess 25. The entry of the hook 34 into the recess is a downward sliding movement between the spring 27 and the hook 24, which converge downwardly to the lower bend in the spring, below which they diverge. The shape of the spring enables it to flex to accommodate entry of the hook 34, and the disposition of the lower bend at or slightly above the base of the nose assures a resistance to accidental withdrawal of the hook 34 and breaking of the last. The spring force of course obtains a corresponding engaging force of the hook 24 in the recess 35.

This arrangement permits the hinge to be a self-contained unit including a locking means. It eliminates the necessity of using a separate locking means such as that exemplified in the earlier Patent No. 2,391,968.

The use of a leaf spring of this type is advantageous because it is simple in construction and may be easily replaced for repair of the hinge. It can flex between its anchored ends in such wise as to permit a convenient unlocking of the last. It also lends itself to the substitution of other similar springs of different forces to take care of different requirements of the use of the last.

What is claimed is:

1. A hinge for a last or the like device having relatively movable fore and aft sections, the hinge comprising forward and aft said hinge plate members for attachment in the respective sections, a link, pivot pins extending through each of the opposite ends of said link and supported respectively in said hinge members, and a lock device comprising interengaging hook members, one member of which is carried by one of said hinge members and the other of which is carried by the other of said hinge members, the hook members being adapted to lock said fore and aft sections with each other when the device is in expanded and closed adjustment, and a spring in one of said sections bearing against the hook member of the other section to yieldably force said hook member of the other section in contact with the hook member of the section in which said spring is disposed, said spring comprising a leaf spring secured to the hook member carried by the hinge and extending therefrom in position to be engaged by the nose carried by hook of the said other hinge member.

2. A hinge for a shoe last or the like device having separable fore and aft sections relatively movable into closed and open positions, the hinge including fore and aft hinge members adapted to be attached respectively to the last sections, each hinge member including side support plates to which is attached a hook member and a pivot pin, a link connecting the said two pivot pins of the said hinge member, each hook member having a recess and a nose and cooperable with one another, so that the nose of one hook member will fit into the recess of the other, one of said recesses having a width greater than the width of its companion nose, and a spring in this recess extending toward its nose to be engaged by the nose of the other hook member when the last device is in expanded and closed adjustment.

3. A hinge for a shoe last or like device having separable fore and aft sections, the hinge includ-

ing fore and aft hinge members adapted to be attached respectively to the last sections of the device, each hinge member including side support plates to which is attached a hook member and a pivot pin, a link connecting the said two pivot pins of the said hinge members, each hook member having a recess and a nose cooperable with one another, so that the nose of one hook member will fit into the recess of the other, one of said recesses having a width greater than the width of the nose of the other hook member, and a spring in this recess extending toward its nose to be engaged by the nose of the other hook member when the last device is in expanded and closed adjustment, said spring comprising a leaf spring anchored at its ends in said hook member and with its middle portion extending to be engaged by the nose of the said other hook member so that it urges said nose into locking relationship with the nose and recess of the member containing the spring when said device is in said expanded and closed adjustment.

4. A hinge for a shoe last or like device having separable fore and aft sections, the hinge including fore and aft hinge members adapted to be attached respectively to the last sections of the device, each hinge member including side support plates to which is attached a hook member and a pivot pin, a link connecting the said two pivot pins of the said hinge members, each hook member having a recess and a nose cooperable with one another, so that the nose of one hook member will fit into the recess of the other, one of said recesses having a width greater than the width of the nose of the other hook member, and a spring in this recess extending toward its nose to be engaged by the nose of the other hook member when the last device is in expanded and closed adjustment, said spring comprising a leaf spring anchored at its ends in said hook member and with its middle portion extending to be engaged by the nose of the said other hook member so that it urges said nose into locking relationship with the nose and recess of the member montaining the spring, the nose of the other hook member having a straight side wall on the side opposite its recess, and the spring having a portion engaging said straight side wall of the interfitting nose of the other hook member to force said nose against the nose of the hook member in which said spring is anchored to lock the device in said expanded and closed adjustment.

5. A hinge for shoe lasts or like devices comprising a fore and aft hinge section, each section consisting of two outer side plates between which a spacer plate member is disposed, each of said side plates having a pivot pin attached thereto and a link connecting the pivot pins of each section, the outer plates in each section being connected in rigid parallel spaced relationship by the specer members, the two hinge sections having complementary interfaces of the two side plates, each spacer plate member having a recess and a hook member, each hook member comprising a projecting nose, whereby the two hook sections may be interlocked together when the hinge is in closed adjustment, and a spring in one of said hinge sections yieldably bearing against the nose of the other hinge section when said hinge is in hooked position, said other hinge section nose having a straight side wall on the side opposite the recess in the hook member where engaged by the spring whereby the spring will yieldably maintain the hinge in closed position.

6. A hinge for shoe lasts or like devices comprising a fore and aft hinge section, each section

consisting of two outer side plates between which a spacer plate in each section member is disposed, each of said side plates having a pivot pin attached thereto and a link connecting the pivot pins of each section, the outer plates being connected in rigid parallel spaced relationship by the spacer members, the two hinge sections having complementary interfaces of the two side plates, each spacer plate member having a recess and a hook member, each hook member comprising a projecting nose, whereby the two hook sections may be interlocked together when the hinge is in closed adjustment, and a spring in one of said hinge sections yieldably bearing against the nose of the other hinge section when said hinge is in hooked position, said other hinge section nose having a straight side wall on the side opposite the recess in the hook member where engeged by the spring whereby the spring will yieldably maintain the hinge in closed position, and a link connected at its ends between the outer plates of each hinge section, the spacer plate members terminating to provide slots in the hinge sections to receive said link.

7. In a last having relatively movable fore and aft sections to open and expand the last, a hinge having fore and aft members attached to the respective last sections, each hinge member including a hook member and a pivot pin rigidly disposed with respect to its last section, a link connecting the said two pivot pins of the said hinge member, each hook member having a recess and a nose cooperable with one another, so that the nose of one hook member will fit into the recess of the other, one of said recesses having a width greater than the width of its companion nose, and a spring in this recess extending toward its nose to be engaged by the nose of the other hook member when the last device is in expanded and closed adjustment.

8. In a last having relatively movable fore and aft sections to open and expand the last, a hinge having fore and aft members attached to the respective last sections, each hinge member including a hook member and a pivot pin rigidly disposed with respect to its last section, a link connecting the said two pivot pins of the said hinge members, each hook member having a recess and a nose cooperable with one another, so that the nose of one hook member will fit into the recess of the other, one of said recesses having a width greater than the width of the nose of the other hook member, and a spring in this recess extending toward its nose to be engaged by the nose of the other hook member when the last device is in expanded and closed adjustment, said spring comprising a leaf spring anchored at its ends in said hook member and with its middle portion extending to be engaged by the nose of the said other hook member so that it urges said nose into locking relationship with the nose and recess of the member containing the spring when said device is in said expanded and closed adjustment.

9. In a last having relatively movable fore and aft sections to open and expand the last, a hinge having fore and aft members attached to the respective last sections, each hinge member including a hook member and a pivot pin rigidly disposed with respect to its last section, a link connecting the said two pivot pins of the said hinge members, each hook member having a recess and a nose cooperable with one another so that the nose of one hook member will fit into the recess of the other, one of said recesses having a width greater than the width of the nose of the other

hook member, and a spring in this recess extending toward its nose to be engaged by the nose of the other hook member when the last device is in expanded and closed adjustment, said spring comprising a leaf spring anchored at its ends in said hook member and with its middle portion extending to be engaged by the nose of the said other hook member so that it urges said nose into locking relationship with the nose and recess of the member containing the spring, the nose of the other hook member having a straight side wall on the side opposite its recess, and the spring having a portion engaging said straight side wall of the interfitting nose of the other hook member to force said nose against the nose of the hook member in which said spring is anchored to lock the device in said expanded and closed adjustment.

10. A hinge for a shoe last or the like device having separable fore and aft sections relatively movable into closed and open positions, the hinge including fore and aft hinge members adapted to be attached respectively to the last sections, each hinge member including a side support plate to which is attached a hook member and a pivot pin, a link connecting the said two pivot pins of the said hinge member, each hook member having a recess and a nose cooperable with one another so that the nose of one hook member will fit into the recess of the other, one of said recesses having a width greater than the width of its companion nose, and a spring in this recess extending toward its nose to be engaged by the nose of the other hook member when the last device is in expanded and closed adjustment.

11. A hinge for a shoe last or like device having separable fore and aft sections, the hinge including fore and aft hinge members adapted to be attached respectively to the last sections of the device, each hinge member including a side support plate to which is attached a hook member and a pivot pin, a link connecting the said two pivot pins of the said hinge members, each hook member having a recess and a nose cooperable with one another so that the nose of one hook member will fit into the recess of the other, one of said recesses having a width greater than the width of the nose of the other hook member, and a spring in this recess extending toward its nose to be engaged by the nose of the other hook member when the last device is in expanded and closed adjustment, said spring comprising a leaf spring anchored at its ends in said hook member and with its middle portion extending to be engaged by the nose of the said other hook member so that it urges said nose into locking relationship with the nose and recess of the member containing the spring when said device is in said expanded and closed adjustment.

12. A hinge for a shoe last or like device having separable fore and aft sections, the hinge including fore and aft hinge members adapted to be attached respectively to the last sections of the device, each hinge member including a side support plate to which is attached a hook member and a pivot pin, a link connecting the said two pivot pins of the said hinge members, each hook member having a recess and a nose cooperable with one another so that the nose of one hook member will fit into the recess of the other, one of said recesses having a width greater than the width of the nose of the other hook member, and a spring in this recess extending toward its nose to be engaged by the nose of the other hook member when the last device is in expanded and closed adjustment, said spring comprising a leaf spring anchored at its ends in said hook member and with its middle portion extending to be engaged by the nose of the said other hook member so that it urges said nose into locking relationship with the nose and recess of the member containing the spring, the nose of the other hook member having a straight side wall on the side opposite its recess, and the spring having a portion engaging said straight side wall of the interfitting nose of the other hook member to force said nose against the nose of the hook member in which said spring is anchored to lock the device in said expanded and closed adjustment.

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