

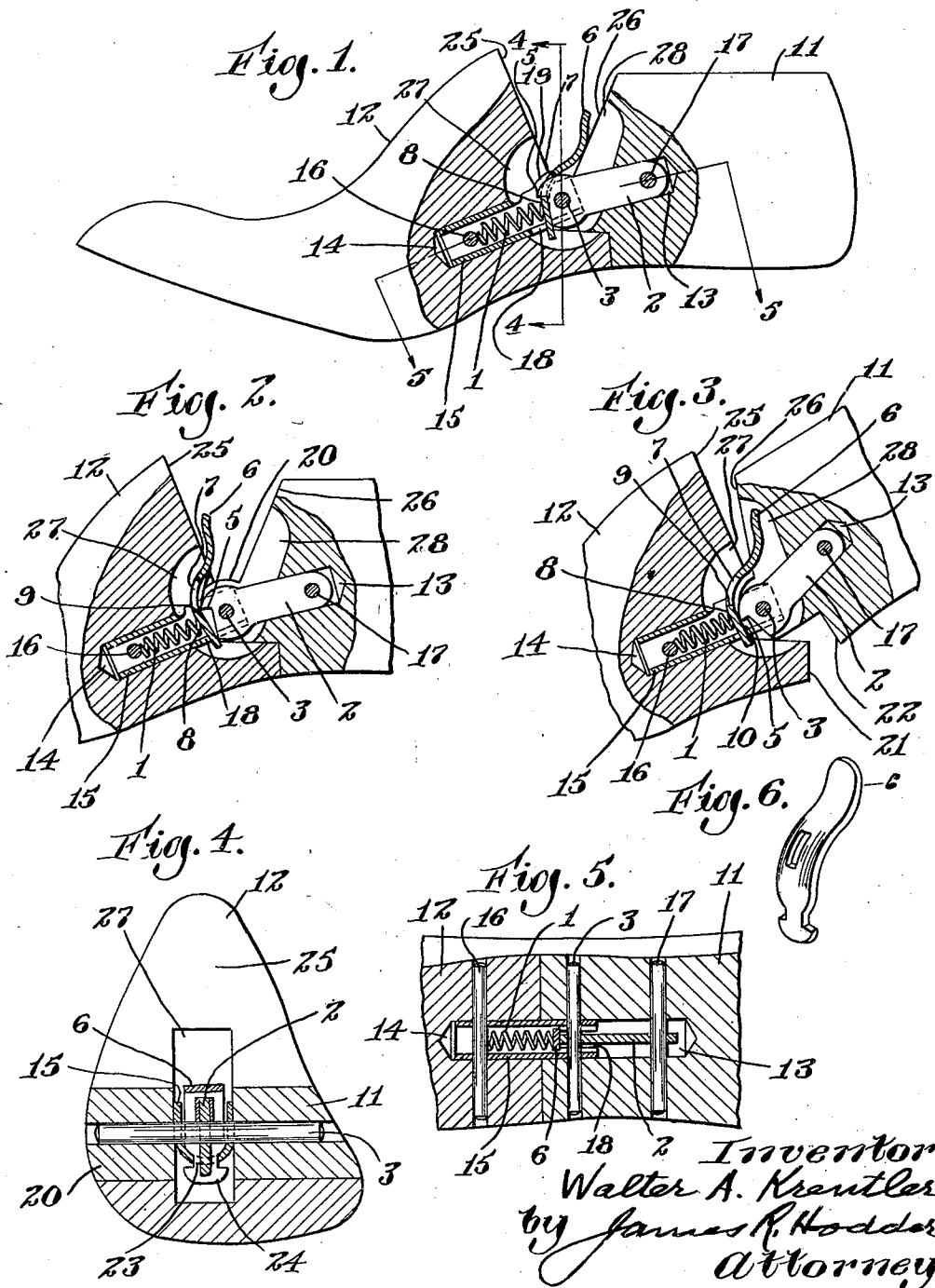
May 15, 1928.

W. A. KRENTLER

1,669,984

LAST

Original Filed Nov. 10, 1926 2 Sheets-Sheet 1



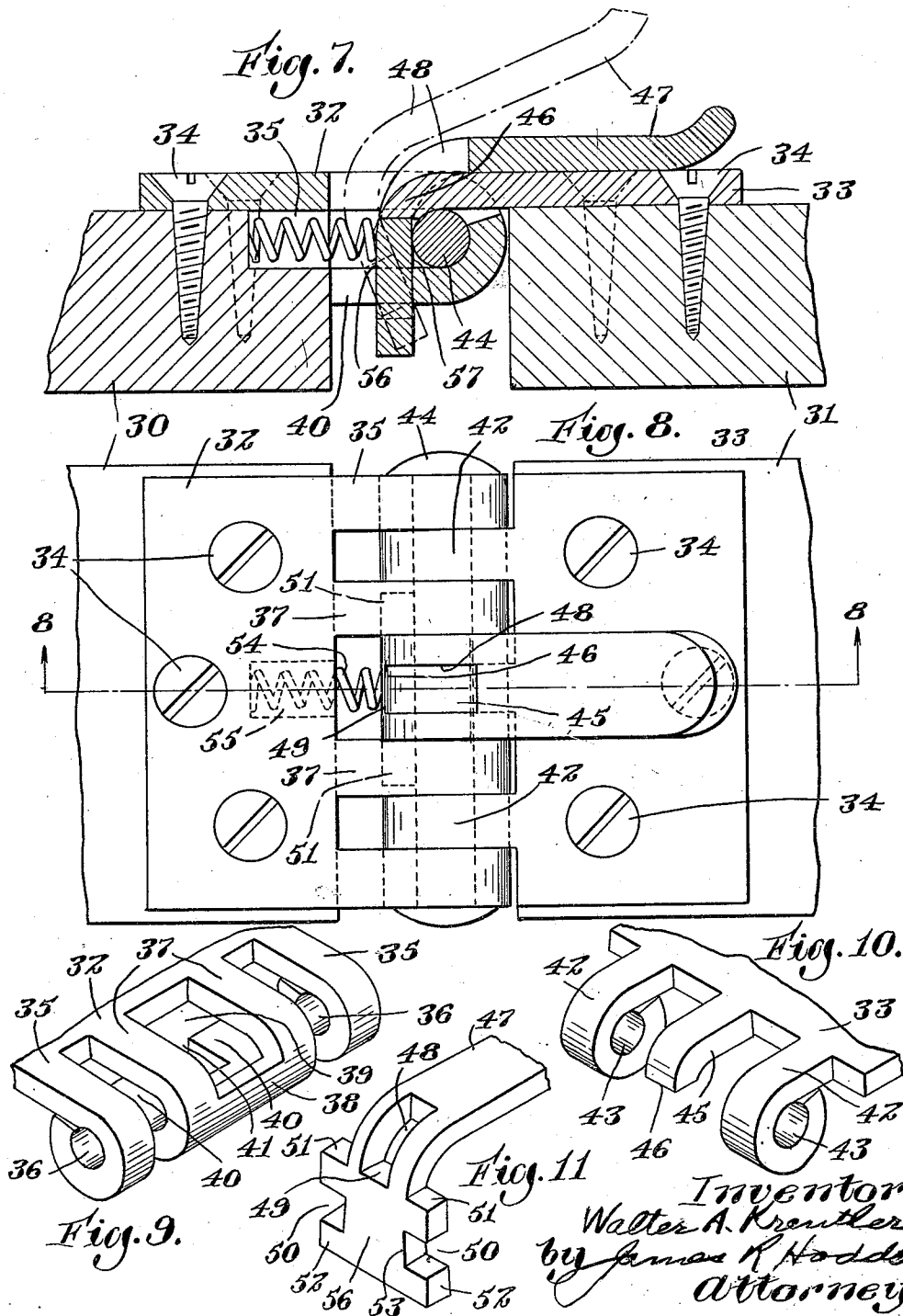
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LAST

Original Filed Nov. 10, 1926 2 Sheets-Sheet 2



## UNITED STATES PATENT OFFICE.

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## LAST.

Original application filed November 10, 1926, Serial No. 147,420. Divided and this application filed February 26, 1927. Serial No. 171,315.

My present invention is an improved last, and is a divisional of my prior and copending application, Ser. No. 147,420, filed Nov. 10, 1926.

6 An important feature of the present invention is to provide a hinge, uniting two relatively movable members, which hinge may be positively locked, to prevent movement of the two members connected by the hinge, and quickly unlocked when desired.

10 A further and important feature of the present invention is the provision for such a positively locked hinge, which may be unlocked without disturbing the relative locked position of the hinge members.

15 Further objects of the invention are to construct such a hinge with a minimum number of parts, thus simplifying and economizing the manufacture of the hinges, and facilitating operation, assembling and repairing.

20 An important adaptation of my novel hinge is its utilization in lasts of the hinge type, and when used to perform the function of a last hinge, presents an improvement over the last structures illustrated in the prior Patents Nos. 1,604,521 and 1,604,522, issued Oct. 26, 1926.

25 In manufacturing hinge lasts it is important to produce a last with great strength, and yet which will have a minimum number of parts, and also with as little weakening or cutting away of the wood of the last as possible. To this end an important feature of my present construction consists in providing a last hinge with four parts, or with but three members, considering the spring and tube as one member. These members comprise a spring, and a tubular hinge member secured to the fore part of the last, a second hinge member secured to the heel part, and a combined spring bearing and holding, locking and unlocking member assembled with the hinge parts, but movable from locking to unlocking position and vice versa without disturbing the relative position of the last or hinge parts in locked or unlocked condition. When the locking and unlocking member is moved to unlocked position, the last parts will still be held in locked position, ready for unlocking or collapsing or shortening, with no further attention being paid to the locking and unlocking member.

A principal difficulty with prior hinge lasts of the locking type was that, in order to move the hinge members to unlocking position, the last parts were necessarily broken slightly. This resulted in a series disadvantage, in that, when the last was broken, however slightly, it would catch the lining, and pinch the lining, and would not give a true form to the shoe. Therefore, in order to produce a satisfactory hinge last of this type, it is necessary to provide the hinge with a locking and unlocking member which may be moved from locked to unlocked position without disturbing the relative positions of the last parts, maintaining a true and smooth surface along the bottom of the last. This I have accomplished by my present novel hinge illustrated and described herein. Furthermore, I so construct my present novel hinge that in moving the locking member to unlocking position, the spring tension exerted on the hinge member secured to the heel part will be increased from the tension exerted when the locking member is in locked position. This further insures holding of the last parts in their relative position.

Furthermore, by the use of my novel hinge, I am enabled to substantially eliminate the recessing of the fore part and heel part of the last, which has heretofore been considered requisite, to accommodate the moving hinge members. This results in a last of greatly increased strength and solidity, lengthening the life of the last, and lessening the danger of breakage of the last parts where so recessed. This also is an important advantage in lasts utilizing my novel hinge.

I believe that my present hinge, comprising the elements and parts above described, namely, a plate, and a spring, together with a locking and unlocking member, which locking and unlocking member also acts as the spring bearing and holding member, and which locking and unlocking member may be moved from locked to unlocked position without disturbing the relation of the other hinge members, is novel, and I have therefore claimed the same herein broadly.

I also believe that a last, constructed and provided with my novel hinge, and with the further advantages peculiar to last construction, and made possible by the use of my

present hinge, is novel, and I have likewise claimed such a last broadly herein.

While the preferred embodiment of my novel hinge has been herein illustrated as applied to a last, it will be appreciated that I am not limited thereto, but may utilize my novel hinge on any articles or in any line where such a hinge would be practicable. I have shown, in the present case, one modification of the application of my novel hinge, and many such applications will doubtless occur to those skilled in the arts.

Further features of the invention, novel combinations of parts, advantages, and details will be hereinafter more fully pointed out and claimed.

Referring to the drawings illustrating preferred embodiments of my present invention,

Fig. 1 is a side view of a last, in locked position, partly in cross section, utilizing my novel hinge;

Fig. 2 is a cross sectional detail illustrating the locking and unlocking member in unlocked position;

Fig. 3 is a cross sectional detail illustrating the last in collapsed position;

Fig. 4 is a cross sectional view on the line 4-4 of Fig. 1;

Fig. 5 is a cross sectional view on the line 5-5 of Fig. 1;

Fig. 6 is a perspective view of the locking and unlocking member;

Fig. 7 is a cross sectional view of a modification of my novel hinge on the line 8-8 of Fig. 8;

Fig. 8 is a top plan view of the structure illustrated in Fig. 7, and

Figs. 9, 10 and 11 are fragmentary details of the hinge parts utilized in this modification.

As shown in the drawings, my novel hinge comprises essentially a spring 1 and plate or toggle 2. A fixed pivot pin 3 is provided for the plate 2. One end of the plate 2 is notched, as shown at the nose or lip 5. A member 6 is interposed between the plate 2 and spring 1, having a recess or slot 7 through which the lip lock or nose 5 projects when the hinge is in locking position. The spring 1 bears against the front face 8 of this locking and unlocking member 6, exerting tension and pressure on the plate 2, to hold the same in locked position. The nose 5 abutting against the lower edge 9 of the slot 7 prevents the hinge being opened, until the member 6 has been moved to unlocking position. On being moved to unlocking position, which consists in pushing the member 6 forwardly, the combined pushing forward and action of the spring 1 on the face 8 will disengage the nose 5 from the recess 7, and slightly raise the member 6 forcing the rear face 10 of the locking member against the nose 5. The member 6 being freely displaceable relatively with the plate

2 does not disturb the relative positions of the hinge parts, leaving said hinge parts in locked position ready to be opened, on pressure being exerted on the hinge members. The movement of the face 8 of the member 6 forwardly, shortens or compresses the spring 1, thus increasing the tension of the spring 1 on the plate 2, and insures the plate 2 remaining in locked position, although unlocked until opening pressure is applied thereto.

The hinge above described is particularly adapted to hinge lasts, of the type illustrated and described in the said prior patents. In the present drawings the last comprising a heel part 11 and fore part 12 is provided. This last is bored or recessed as shown at 13 in the heel and 14 in the fore part. A tube 15 is inserted in the recess 14 and held in place by a rivet or pin 16 passing through the wood of the fore part and the tube. The plate or toggle 2 is held in position in the recess 13 by a pin 17, passing through the wood of the last and the plate. The tube 15 is slotted at its rearmost end, as shown at 18, to permit the insertion of the front end of the plate 2, and the tube 15 and plate 2 are pivoted on the common pivot pin 3. The spring 1 is inserted in the tube 15, one end of the spring bearing against the pin 16, and the other end of the spring bearing against the face 8 of the locking member 6, which locking member or trigger 6 is shown in Fig. 1 in locked position, with the nose or lip 5 entering the slot 7 and resting upon the lower edge 9 of said slot. The fore part 12 and heel part 11 are divided by a line of cut to give to the abutting faces a "knuckle joint" construction, wherein the forepart 12 is formed with a concave face 19 and the heel part with a corresponding projecting knuckle or convex surface 20. This line of cut also terminates at the bottom of the last in the abutting faces 21 on the forepart and 22 on the heel part, and provides a firm lock or bearing against breaking tension during the bottoming or other operations.

With the last in extended position, as shown in Fig. 1, a locking contact of great strength is required and for this purpose the nose or projection 5 and bottom 9 of the slot 7 produce a positive unbreakable locking action on the hinge members, and hence on the last parts 11 and 12. This structure, combined with the knuckle joint feature, assures positive locking engagement irrespective of any wear of the wood, pins, metal, or looseness in these parts, affords great rigidity and is able to withstand torsional or other breaking strains in the last. I so form these interlocking members or surfaces as to render the collapsing or flexing of the last impossible, without first releasing the member 6 from locking engagement. This locking member 6 has a neck 23, which slides in

the slot 18 in the tubular hinge member 15, and an enlargement or head 24 on the bottom of the member 6 prevents removal of the said member from the slot, upwardly, the hinge plate 2 preventing removal of the member 6 rearwardly of the slot.

When it is desired to unlock the last, leaving same in condition to be collapsed, the locking member 6 is moved forwardly to the position illustrated in Fig. 2; whereupon the combined forward movement and tension of the spring will release the nose or projection 5 from the recess 7, and will slightly raise the member 6, until the nose 5 abuts against the rear face 10 of the member 6. This unlocking movement of the member 6 is effected without movement or distortion either of the hinge or of the last parts, leaving the last parts still in locked position, although unlocked. This is of great advantage; and presents a smooth, finished surface along the bottom of the last, preventing pinching or gripping of the lining of the shoe. With the member 6 in unlocked position, the last parts, as clearly shown in Fig. 3, can be readily, quickly, and easily collapsed, or shortened, as shown in Fig. 3, thus permitting great speed in the operation of pulling a last from the shoe, eliminating the danger of straining the shoe upper during the action, and presents a distinct and desirable feature in hinge last construction. In order to permit full flexing of the last parts, and permit the faces 25 of the fore part and 26 of the heel part to contact, I may recess the forepart 12 slightly at 27 to accommodate or house the locking and unlocking member 6, but such recess is so small as to in no way weaken the wood of the last. A recess 28 is also formed in the heel part 11 in which the locking member 6 is housed, see Fig. 3, the locking member 6 being so constructed and arranged that the lower part of the handle portion will be housed in the recess 27 and the upper part of the handle portion housed in the recess 28.

When desired to again extend the last, to assume the position illustrated in Fig. 1, it is only necessary to swing the heel part of the last around the pivot 3, until the two parts of the last have assumed the position in Fig. 1, the spring 1 assisting in moving the heel part to locking position, whereupon the locking and unlocking member 6 instantly and automatically returns to normal locking position. To insure positive locking of the hinge parts, the rear face of the trigger 6 is concaved adjacent the slot 7. Thus, should either the locking portion 5 of the toggle 2, or the slot 7 of the trigger 6 be out of line, the nose 5 will be guided by the concaved sides of the trigger into the slot 7. This is an important feature, and in-

sure positive locking of the last and hinge parts. It will thus be seen that I have produced a novel last, incorporating my novel hinge features, greatly simplifying the structure of said hinge, and facilitating operation of the last, as well as resulting in great economy of manufacture. My last also is extremely simple to assemble and of great strength, as well as protecting the hinge members and concealing the locking parts. Thus I have produced a novel and desirable last of the so-called "knuckle joint" or hinge type.

Referring now to Figs. 7 to 11, inclusive, these illustrate a modification of my novel hinge, and the application thereof to articles other than lasts, but the structures, and principles of operation, of the two forms are so closely correlated that I have included this modification in the present application. As shown in these Figs. 7 to 11, this form of my novel hinge is applied to two relatively movable parts 30 and 31, which may represent a door, for example, or the like. In the present modification, my hinge comprises two parts or leaves 32 and 33, each one fixed to its relatively movable part by screws or the like 34. The hinge leaf or member 32 has a plurality of arms, the outer arms 35, 35 terminating in eyes 36. The inner pair of arms 37 meet at 38 to form a slot 39, and terminate at their under side in shoulders or projections 40, forming between these shoulders a slot or opening 41.

The hinge leaf or member 33 has a pair of arms 42, 42, looped to form eyes 43, 43. When assembled, the eyes 43 and 36 are in alignment, and a pintle 44 passes there-through, forming an articulated joint. The leaf 33 also has a central arm 45 formed at its outer end 46 with a slight hook or curve.

A locking and unlocking lever or member 47 is interposed between the two leaves 32 and 33, and has a slot 48 into which the hook or nose 46 of the arm 45 normally projects. When in locked position, as shown in Figs. 7 and 8, the hook or nose 46 is in the slot 48, resting on the lower edge 49 of said slot, and the shoulders or projections 40 engage the recesses 50, 50 formed by the pairs of lugs 51, 51 and 52, 52, the neck 53 fitting in the slot or recesses 41 between the shoulders 40. A spring 54 is provided, one end resting in a recess 55 and the other end abutting against the face 56 of the locking lever or member 47. Thus the locking lever is held in locked position by the pressure of the spring 54, firmly holding the locking member in engagement as shown. When desired to unlock the hinge, the member or lever 47 is moved to the position shown in dotted lines in Fig. 7, whereupon the recess 48 is freed from the nose 46 and due partially to the forward movement of the lever

47 and partially to the tension of the spring against the face 56, the locking lever will be moved slightly upward, until the rear face 57 abuts against the nose 46, the spring 54 still exerting tension thereagainst, and maintaining the hinge members as well as the parts to which they are secured in locked position, although ready for unlocking. The movement of the lever 47 from locked to unlocked position does not disturb the relative positions of the hinge members or hinge parts.

After articulation or opening of the hinge, and upon return of the hinge members to the position shown in Fig. 7, the locking lever 47 will automatically return to locked position, preventing articulation of the hinge until movement of the locking member 47 to unlocking position.

I believe that such a novel articulated hinge, capable of being locked in rigid position, and capable of having the locking means moved to unlocking position without disturbing the relative position of the hinged parts, is novel, and I have therefore claimed the same herein broadly.

The close relation of the two forms of hinges illustrated in the present case will be apparent from a glance at the drawings. For example, the leaf 32 corresponds to the tube 15, the leaf 33 corresponding to the toggle 2. The trigger is substantially the same in each instance. The pintle 44 corresponds to the pivot pin 3, and the spring 54 performs the same function as the spring 1. Thus I have utilized the same principles of construction and operation in each of the forms of hinge illustrated herein, and although each is applicable to a different purpose, the similarity of principle and operation warrants the inclusion of both forms in the present case.

While I have necessarily described my invention somewhat in detail, it will be appreciated that I am not limited thereto, but may vary the size, shape and arrangement of parts within reasonably wide limits without departing from the spirit of the invention so long as I adhere to the general theory and principle of an articulated hinge, utilizing a single locking and unlocking member, detachably interposed between the hinge members, and serving the triple purposes of spring bearing and holding, locking, and unlocking, and capable of movement from locking to unlocking position without disturbing the relation of the hinge parts.

Having thus described my invention, what I claim as new is:

1. A two part last having hinged members, one member being of tubular form and

secured to one part, the other member being a plate and secured to the other part, a pivot pin uniting said members, a combined locking and unlocking element interposed between said members, and means to hold said element in locking or unlocking position.

2. A two part last having hinged members, one member being of tubular form and secured to one part, the other member being a plate and secured to the other part, a pivot pin uniting said members, a combined locking and unlocking element interposed between said members, and a spring to hold said element in locking or unlocking position.

3. In a two part last, a hinge comprising two relatively movable members, a trigger detachably interposed between said members, a projection on one of said relatively movable members, said trigger provided with a slot, and means to guide said projection into said slot to lock the relatively movable members.

4. In a two part last, a hinge comprising two relatively movable members, a trigger detachably interposed between said members, a projection on one of said relatively movable members, said trigger provided with a slot, the sides of the trigger adjacent the slot being concaved to guide said projection into said slot to lock the relatively movable members.

5. In a two part last, a hinge comprising two relatively movable members, a trigger detachably interposed between said members, a projection on one of said relatively movable members, said trigger provided with a slot, the sides of the trigger adjacent the slot being concaved to guide said projection into said slot to lock the relatively movable members, said trigger being movable to unlocking position without disturbing the relation of the hinge members.

6. In a two part last, a hinge comprising two relatively movable members, a trigger detachably interposed between said members, a projection on one of said relatively movable members, said trigger provided with a slot, the sides of the trigger adjacent the slot being concaved to guide said projection into said slot to lock the relatively movable members, said trigger being movable to unlocking position without disturbing the relation of the hinge members, and a spring bearing against said trigger in both locking and unlocking position.

In testimony whereof, I have signed my name to this specification.

WALTER A. KRENTLER.