Dec. 21, 1954 H. KRAUSE 2,697,625

SELF-ADJUSTING LATCH

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Fig. 1

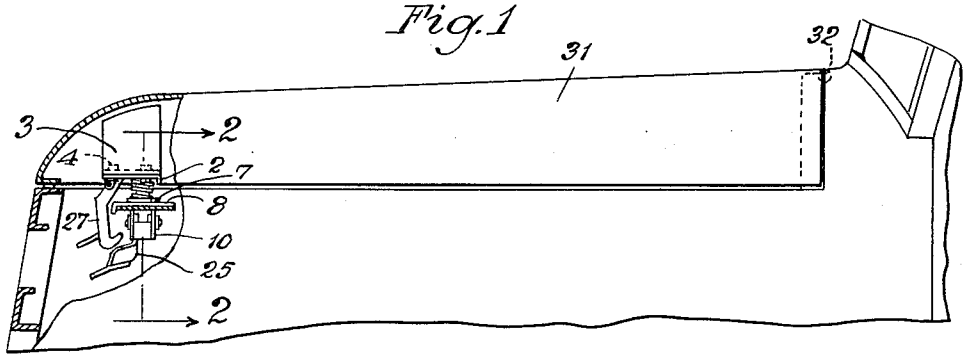


Fig. 2

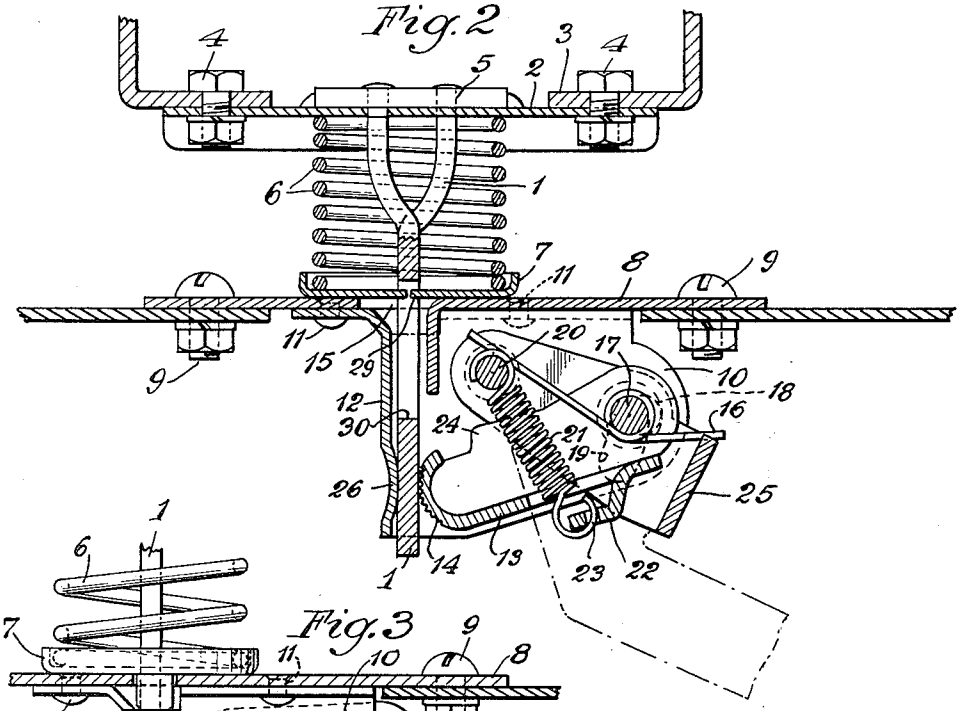
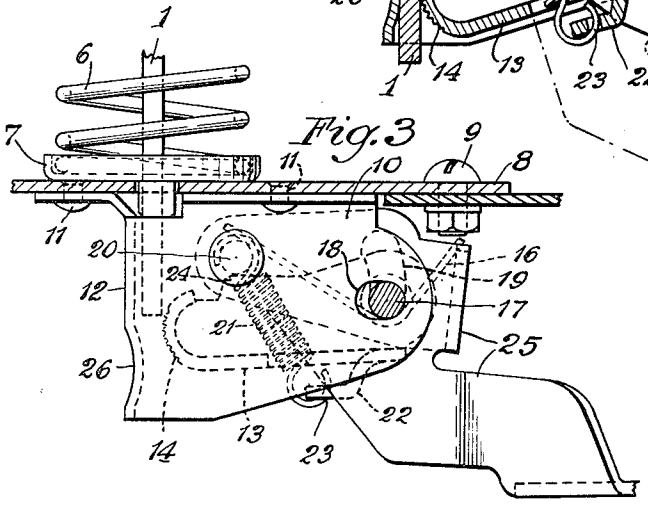


Fig. 3



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Fig. 4

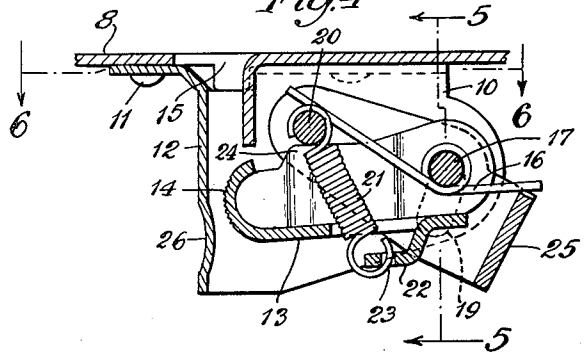


Fig. 5

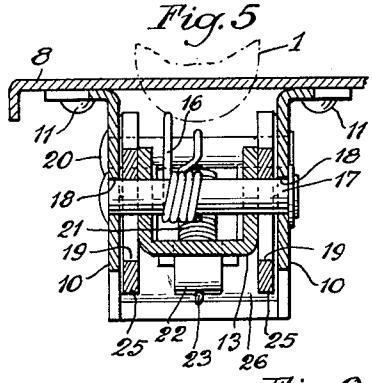


Fig. 10

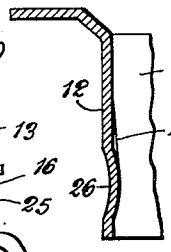


Fig. 9

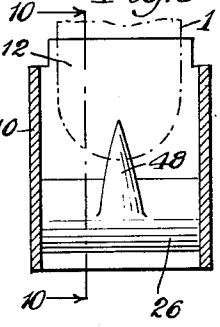


Fig. 6

Fig. 7

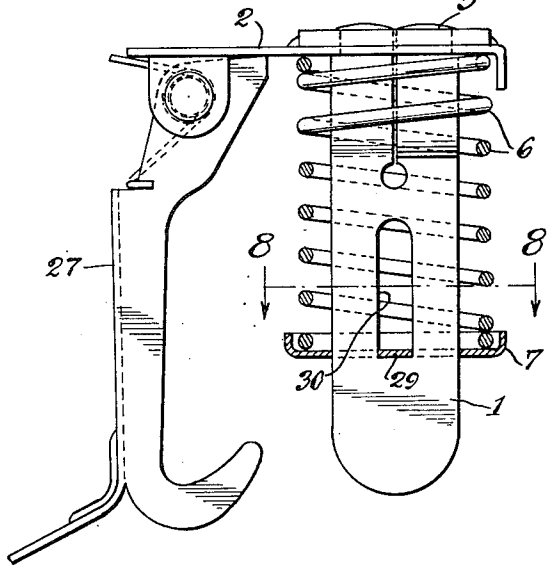
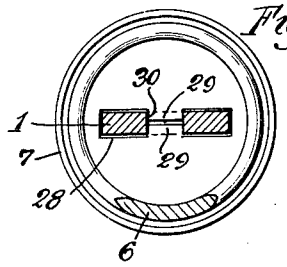


Fig 8



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Fig. 12

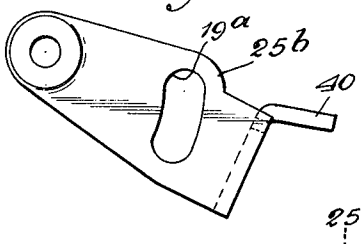


Fig. 13

Fig. 11

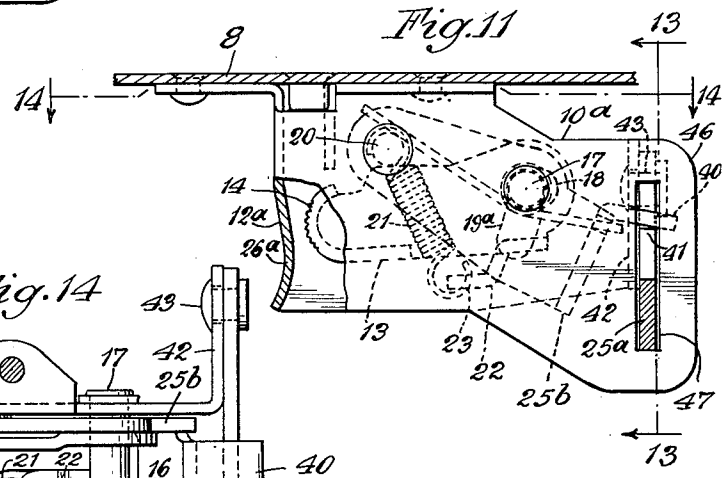
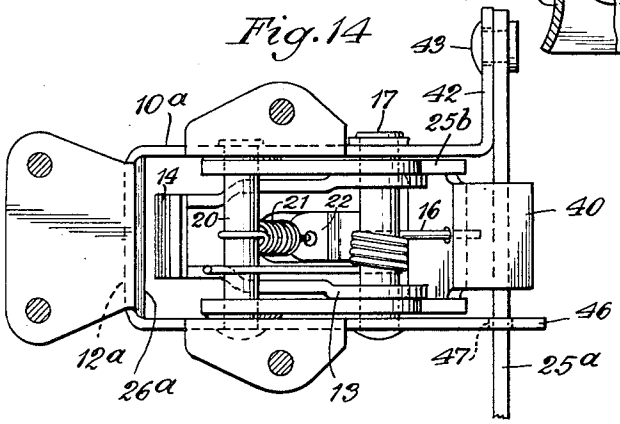


Fig. 14



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SELF-ADJUSTING LATCH

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Application August 21, 1952, Serial No. 305,612

7 Claims. (Cl. 292—64)

My invention relates to an improvement in hood latches and is particularly applicable, though not limited, to hood latches as applied to alligator type hoods in which the hood closure is hinged or movably mounted at its rear end in such fashion that the forward end may be swung up to give access to the parts within the hood. Experience has taught that prior latches raise serious problems in the matter of close adherence to size and shape specifications, and to proper assembly on the assembly line. Such latches have been of a type requiring close tolerances because of the requirement for the keeper on the hood closure to be in an exact position before the latch was permitted to slide into place. Unless the keeper be in this exact position, either the danger of inadvertent opening of the hood closure or the presence of rattles results. Therefore, it is one purpose of my invention to provide an improved latch assembly which will be effective to prevent the opening, or any movement whatever, of the hood closure even though the keeper be in a variety of positions in relation to the latch.

Another purpose is to provide an improved latch assembly in which force exerted in an effort to extract the keeper results in an increase in the securing pressure of the latch.

Another purpose is to provide a latch which may be easily released with a minimum of pressure and movement of parts.

Another purpose is to provide a latch assembly which is easy to manufacture and which requires a minimum of individual parts.

Another purpose is to provide a latch assembly in which portions of the latch assembly are effective automatically to take up for wear or for variations in size, shape and location of the parts incidental to assembly line practice.

Other purposes will appear from time to time in the course of the specification and claims.

I illustrate my invention more or less diagrammatically in the accompanying drawings, wherein:

Figure 1 is a side elevation indicating one form of latch installation;

Figure 2 is a section on line **2—2** of Figure 1 on an enlarged scale;

Figure 3 is a view similar to Figure 2 with the parts shown in the latch-release position;

Figure 4 is a view similar to Figure 2 with the parts shown in the keeper-receiving position;

Figure 5 is a section on the line **5—5** of Figure 4;

Figure 6 is a section on the line **6—6** of Figure 4;

Figure 7 is a side view of the keeper and safety latch assembly; and

Figure 8 is a section on the line **8—8** of Figure 7;

Figure 9 is a front view of a variant form of keeper abutment;

Figure 10 is a section on the line **10—10** of Figure 9;

Figure 11 is a side view showing a variant form of latch support and, in cutaway section, a variant form of keeper-abutment;

Figure 12 is a detail side view of a variant form of a portion of the latch actuating element as shown in Figures 1, 3 and 6;

Figure 13 is an end view taken on the line **13—13** of Figure 11 of the latch showing a variant form of latch actuating element;

Figure 14 is a view taken on the line **14—14** of Figure 11.

Like parts are indicated by like symbols throughout the specification and claims.

Referring to the drawings, **31** generally indicates an automobile hood closure which may be hinged or otherwise movably secured at its rear end, a hinge **32** being diagrammatically illustrated. It will be understood, however, that the latch assembly described herein is not limited to use with the hood illustrated and since the details of the hood closure, the hinge mechanism therefor, and the method of attachment of the latch assembly to the hood and hood closure do not of themselves form part of the present invention, the parts shown in Figure 1 should be taken as merely a diagrammatic illustration of one form of latch installation.

1 illustrates a keeper which is attached to any suitable plate **2** as at **5**, the plate **2** being attached to one of the members to be secured, such as illustrated at **3**, by any suitable connection **4**. A spring **6** surrounds a portion of the keeper **1** nearest the plate **2**. The retaining washer **7** is slidably mounted on the keeper **1** as indicated at **28**, **29** and **30**, the flanges **29** being bent inwardly into the slot **30** as a stop for the washer **7** and the spring **6**.

8 illustrates a latch plate suitable for attachment to one of the members to be secured as indicated at **9**. The latch plate **8** is apertured as at **15** to receive the keeper **1**. Attached as at **11** to that side of the latch plate **8** which is opposite the side approached by the keeper in its movement toward locking position is the latch support **10**. The support **10** has rigidly mounted thereon the axle **20**. Rotatably mounted on the axle **20** is the latch actuating element **25** which is yieldingly held by the sprnig **16** in a position which permits the latch **13** to retain the keeper **1**.

The support **10** has the elongated aperture **18** through which extends the pin **17**. The pin **17** likewise extends through the arcuate aperture **19** in the latch actuating element **25**.

Rotatably mounted on the pin **17** is the latch **13** having at its end which is furthest removed from the pin **17** the arcuate frictional gripping end **14**.

The spring **21** is attached to the axle **20** and at its opposite end to the flange **22** of the latch **13**, as at **23**, and serves to yieldingly hold the latch **13** in the latching position when the keeper is inserted and in the keeper-receiving position when the keeper is removed.

Indicated at **24** is an abutting surface of the latch **13** formed and adapted to contact the axle **20** thereby limiting the upward movement of the latch **13**.

In fixed relation to the latch **13** is the keeper abutment **12** which has the raised surface portion **26** extending into the path of the keeper **1**.

Illustrated in Figure 7 is the safety latch **27** which is mounted on the plate **2** and is so formed as to be in position, as illustrated in Figure 1, to engage the latch plate **8** when the latch **13** is released. The safety latch does not of itself form part of the invention and will not be further discussed.

Illustrated in Figures 11–14 is a variant form of the latch actuating element **25** which is numbered **25*a*** and **25*b***. In this form of my device the support **10** is replaced by the support **10*a***, having a rearwardly extending wall **46** which in turn has the vertical slot **47** adjacent its rear edge as viewed in Figure 11. The opposite wall of the support **10*b*** has the ear **42** bent at right angles. The member **25*a*** is pivotally mounted as at **43** on the ear **42** and extends through the slot **47**. At a point substantially removed from the support **10*a***, in the direction opposite from the pivot **43** the member **25*a*** is turned as at **44** to form a handle portion **45**. The member **25*a*** has a raised portion or upward projection **41** disposed between the walls of the support **10*a***.

Figure 12 illustrates the other portion of the latch actuating element which is numbered **25*b***. It will be seen that this element corresponds to the pivoted and slotted portions of the latch actuating element **25** illustrated in Figures 1 through 6, and the slot **19*a*** corresponds to the slot **19**. The element **25*b***, however, has the ear or bent portion **40** secured thereto. As best seen in Figure 14, the ear **40** is disposed between the walls of the support **10*a*** to overlie the projection **41**, the yielding means

16 being effective to maintain pressure contact between the ear 40 and the projection 41 throughout the movement of the latch actuating arm 25*a*.

In Figures 9 and 10 I illustrate a grading portion 48 which may be fixed to the keeper abutment 12 and the raised portion 26 to provide a gradual rise therebetween. A variant form is shown in Figure 11 in which the keeper abutment 12*a* is so formed as to provide a more gradual rise in the raised portion 26*a*.

The use and operation of my invention are as follows:

When the hood closure or similar member illustrated by Figure 3 is pressed downwardly, the keeper 1 enters the aperture 15 and the lower end of the keeper 1 first contacts the arcuate abutting surface 14. At this stage, the parts are in the position illustrated in Figure 4. Continuing downward pressure of the keeper 1 forces the latch 13 to rotate on the pin 17 into the position shown in Figure 2. The keeper 1 has thus been forced between the raised abutting surface 26 on the abutment 12 and the arcuate frictional gripping surface 14 of the latch 13. The spring 21 is effective to hold the latch 13 in the position shown in Figure 2 so long as the keeper remains inserted as shown. It will be seen that, as best illustrated in Figure 4, the channel immediately below the aperture 15 is restricted by the members 14 and 26 to a size less than the thickness of the keeper 1. This restriction is located at a point above that at which the surfaces 26 and 14 are each in contact with opposite sides of the keeper 1. As will be seen best in Figure 2, the gripping end 14 contacts the keeper 1 at points more removed from the plate 8 than the axis of rotation of the latch 13, and the pin 17 is held against movement parallel to that of the keeper by the sides of the aperture 18. Thus any upward force tending to pull the keeper 1 out of engagement is directed toward forcing the frictional gripping end 14 of the latch 13 back into the position shown in Figure 4 and thus is directed toward a reduction in the channel aligned with the aperture 15 through which the keeper 1 must be drawn. Thus any effort to extract the keeper 1 without releasing the latch 13 merely serves to increase the grip of the latch 13 on the keeper 1.

Like the latch mechanism itself, the release mechanism is equally simple and easily operated. Rotation of the latch actuating element 25 in a counterclockwise direction on the axle 20 causes the arcuate aperture 19 in the element 25 to change its position relative to the pin 17 which it surrounds, thus causing the pin 17 to move in a direction away from the keeper 1, and causing the latch 13 which is mounted upon the pin 17 also to move away from the keeper 1. The pin 17 in such movement travels within the aperture 18 in the support 10. It will be seen that an extremely small amount of movement is required in order to release the keeper 1, which, under the influence of the spring 6, leaves the aperture 15 immediately upon release.

It will be seen that the keeper 1 need not extend as deeply below the aperture 15 as is illustrated in Figure 3 in order for the latch 13 to accomplish its retaining function fully. So long as any portion of the keeper 1 extends between the latch member 13 and the abutment surface 26, the latch is completely effective to retain the keeper.

The camming connection including the pin 17, the arcuate aperture 19 in the latch actuating element 25 and the elongated aperture 18 in the support 10 provides, in cooperation with the particular gripping function of the latch 13, in combination, a quick and easy release and latch-holding mechanism. As best seen in Figure 2, the pin 17 is effective to retain the latch 13 in the latch position and if force be exerted tending to remove the keeper 1, this force is transmitted through the latch 13 and the pin 17 to the support 10, securely holding the keeper 1 from outward movement. Movement of the actuating element 25 toward the latch plate 8 causes the arcuate aperture 19 to change its position in relation to the pin 17, forcing the pin 17 to move in the aperture 18 in a direction away from the keeper 1 and causing the release of the latch 13. Upon release of pressure on the actuating element 25, yielding means 21 is effective to return the latch 13 to the keeper-receiving position shown in Figure 4 and yielding means 16 is effective to return the actuating element 25 to the position shown in Figures 2 and 4 which is such as to permit the latch 13 to meet and retain the keeper 1.

In Figures 11–14 I illustrate a variant form of latch actuating element as best seen in Figure 13. The handle 45 of the latch actuating element 25*a* extends substantially forward of the latch when the parts are in the position shown in Figure 1 and may therefore be operated, for example, from a point outside the radiator grills of automobiles. When the handle portion 45 is raised, the upward projection 41 on the element 25*a* exerts pressure on the ear 40 on the camming member 25*b*, thus producing the action immediately described above.

In Figures 9, 10 and 11 I illustrate variant forms of the keeper abutment 12. In Figures 9 and 10 a grading element or portion 48 is shown as being affixed, for example, by welding, to the abutment 12 illustrated in Figure 2. In Figure 11 the abutment 12 is shown as being bent inwardly into the path of the keeper and forming a gradual raised portion 26*a*. The purpose of these two forms is to provide an abutment against which the keeper 1 may slide with a maximum of ease.

It will be realized that whereas I have described and illustrated a practical and operative device, nevertheless, many changes may be made in the size, shape, number and disposition of parts without departing from the spirit of my invention. For example, although I have illustrated the best form in the drawing, the striated face of the arcuate frictional gripping end 14 could be utilized on either side of the keeper 1 or on the surface 26. I, therefore, wish my description and drawings to be taken as in a broad sense illustrative or diagrammatic, rather than as limiting me to my precise showing.

I claim:

1. In a latch assembly for automobile hoods, a latch support apertured to receive a keeper, a latch element pivoted and slidably mounted on said support and having a gripping end adapted to engage said keeper in abutting pressure relationship after said keeper, in its movement toward latched position, has passed through the plane wherein the axis of rotation of said latch lies, an abutment in fixed relation to said support adapted to engage said keeper in abutting pressure relationship and a manually operable latch actuating element pivoted to said support at a point between said abutment and said latch axis, said actuating element having an arcuate slot surrounding said latch axis, said slot lying in a plane generally parallel with the path of said keeper, the arc of said slot being directed outwardly of said path.

2. The structure of claim 1, characterized by and including a latch element having an arcuate serrated frictional gripping end adapted to engage a keeper in abutting pressure relationship.

3. The structure of claim 1, characterized by and including a fixed abutment having a raised portion extending into the path of the keeper in line with the aperture in said latch support.

4. The structure of claim 1, characterized by and including a fixed abutment having a raised portion extending in a gradual rise into the path of the keeper in line with the aperture in said support.

5. In a latch assembly for automobiles and the like, a supporting plate having a keeper-receiving aperture adapted to receive a keeper penetrating the aperture in a path generally perpendicular to the plate, a support on said plate, a manually movable latch actuating element pivotally mounted on said support for rotation about an axis spaced away from the plate but lying in a plane generally parallel to the general plane of said plate, an abutment fixed in relation to said plate and underlying said keeper aperture, an opposed latch element mounted for arcuate and linear movement toward and away from said abutment the axis of said latch lying within an area defined by a generally horizontal slot in said support extending toward and away from said keeper path, said opposed latch element having a frictional gripping end, said actuating element having a generally arcuate slot surrounding said latch axis whereby movement of said actuating element urges said latch linearly within said horizontal slot.

6. The structure of claim 5, characterized by and including yielding means in operating connection with said latch actuating element and with said latch element effective to return said latch element and said keeper-receiving actuating element to the latched position.

7. In a latch assembly for automobile hoods, a supporting plate having a keeper-receiving aperture adapted to receive the keeper in a path generally perpendicular to

the plate, a support on said plate on the side opposite to that from which the keeper approaches the plate when moving toward locking position, a movable latch actuating element mounted on said support for rotation about an axis spaced from the plate, but lying in a plane generally parallel to the general plane of said plate, an abutment fixed in relation to said plate, an opposed latch element mounted on said support for linear and arcuate movement toward and away from said abutment, the axis of rotation of said latch element being spaced from said plate and lying in a plane generally parallel to the general plane of said plate, said opposed latch element having a frictional gripping end, yielding means tending to force said latch element toward said abutment at a point substantially more removed from the plate than the axes about which the latch element and the latch actuating element rotate, a slot in said support generally parallel to said plate and a vertically arcuate slot in said actuating element overlying said first slot to form a connection between said latch element and said latch actuating element formed and adapted to permit linear movement of the latch element away from said abutment, and yielding

means tending to force said latch actuating element and said latch element through said connection into the latching position, the arrangement of parts being such that the said gripping end normally rotates on said support in an arc spaced from said abutment at a distance less than the thickness of a keeper, thus permitting said gripping end to exert retaining pressure on a keeper opposite a multitude of points along said abutment and causing motion of the keeper away from the locked position to result in increased locking pressure.

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