United States Patent [19]

Markovitch

[11] **3,924,887**

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[54] **PIVOTING LINK SAFETY LATCH**

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[73] Assignee: **Samuel P. Simmons,** Lomita, Calif.

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[52] **U.S. Cl.** **292/283**

[51] **Int. Cl.²** **E05C 19/08**

[58] **Field of Search** 292/114, 262, 275, 338, 292/283

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Primary Examiner—Richard E. Moor

Attorney, Agent, or Firm—John Holtrichter, Jr.

[57] **ABSTRACT**

Safety latch has a latch mechanism securable to a door which cooperates with a latchplate securable to a doorframe, or vice versa, to limit the opening of the door. The safety latch has a body secured to the door, an intermediate link pivoted thereto, and an outer link pivoted to the intermediate link. A latch is movably mounted upon the outer link to selectively engage with the latchplate. When engaged, the links can fold outwardly from the base to permit the door to open, but only a limited extent.

10 Claims, 15 Drawing Figures

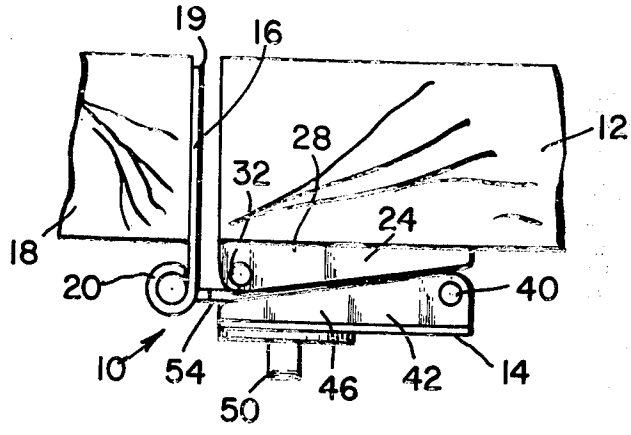


Fig. 1.

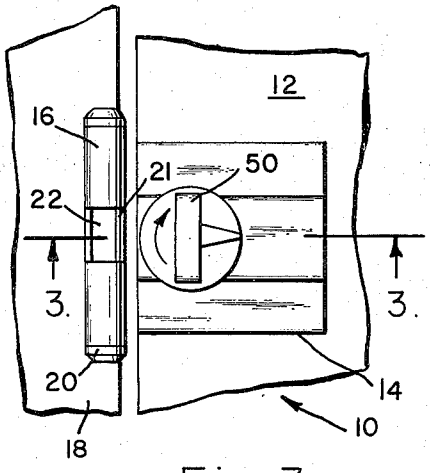


Fig. 2.

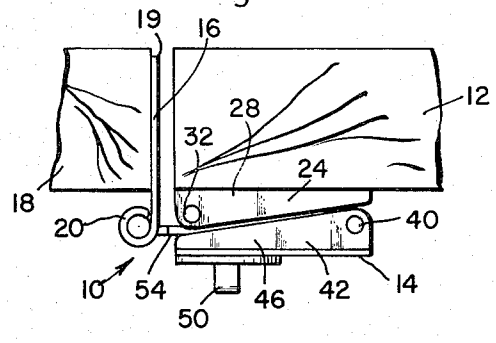


Fig. 3.

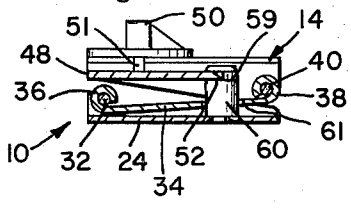


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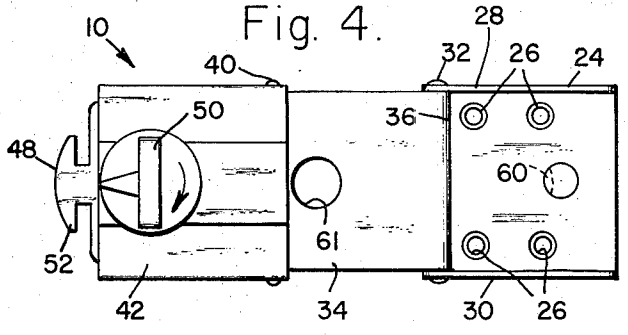


Fig. 5.

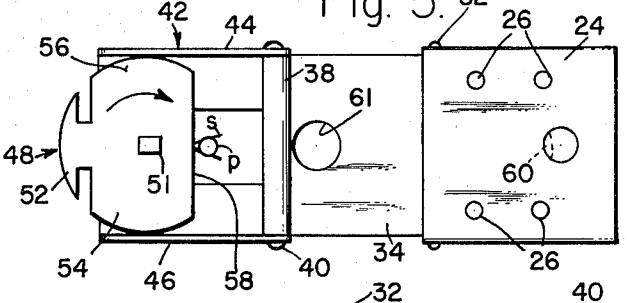


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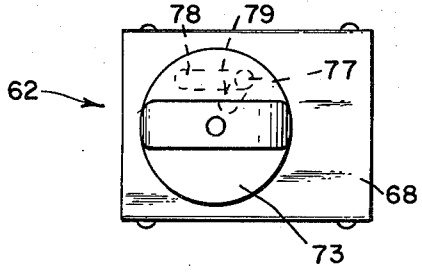


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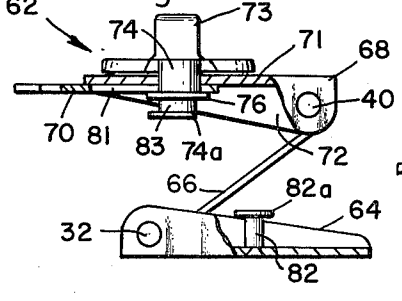


Fig. 10.

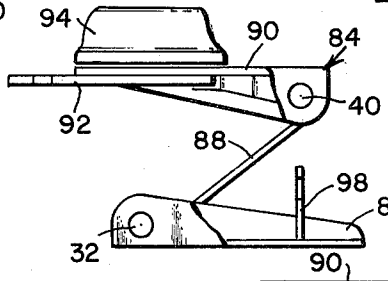


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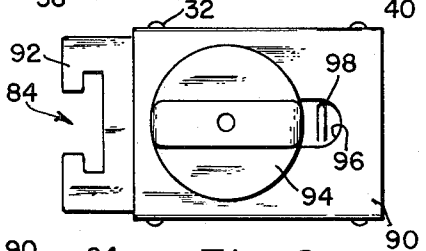


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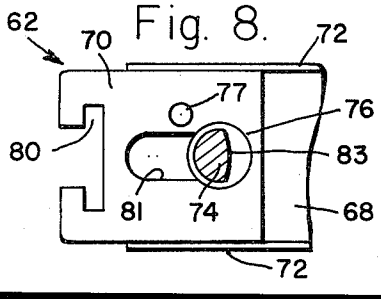


Fig. 11.

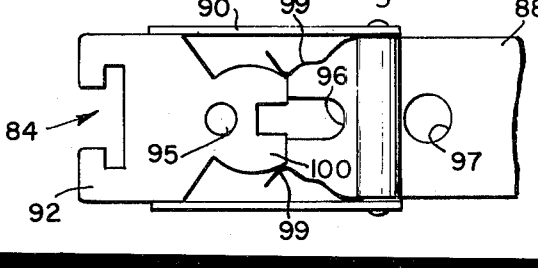


Fig. 12.

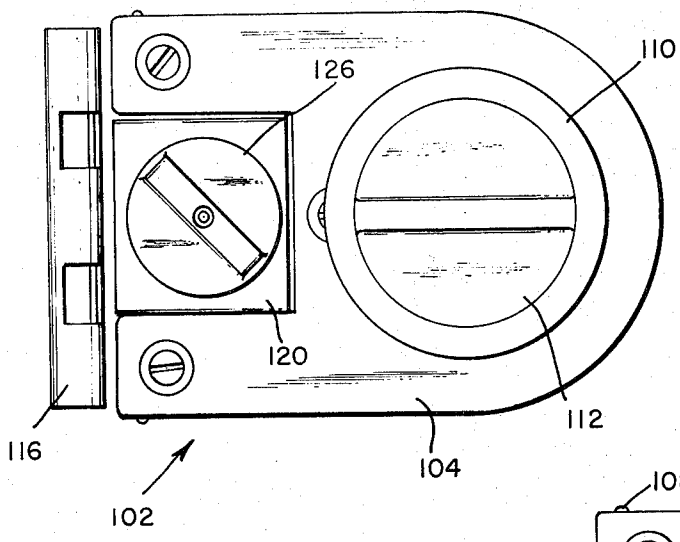


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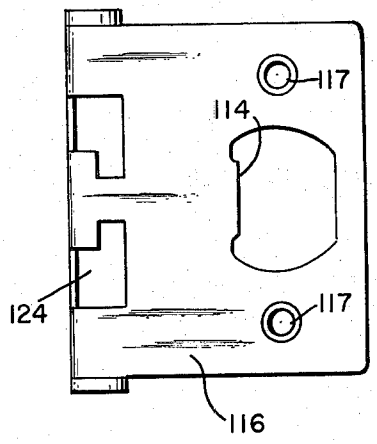
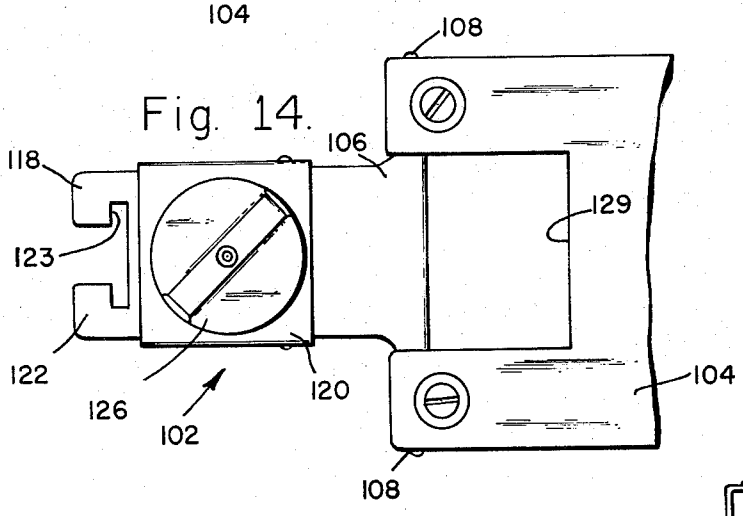


Fig. 14.



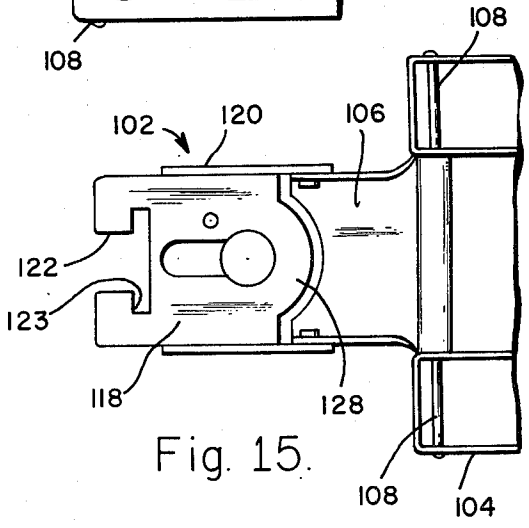


Fig. 15.

PIVOTING LINK SAFETY LATCH

BACKGROUND OF THE INVENTION

This invention is directed to a safety latch for fastening to a door to permit the door to be opened a limited distance.

When the security of person or property is involved, door locks and latches are required. Many types of locks have been created to retain doors in closed position, except at the manipulation of the owner. In addition, there are a number of reasons why it is desirable for a door to be permitted to swing open a limited amount and prevented from swinging further open. Such limited swinging permits ventilation without access and permits inspection outward through the limited door opening also without access. Accordingly, a number of structures have been created for stopping a door from fully opening.

For the most part, these prior art structures comprise a chain fixed at one end and detachably securable at the other end for connection between the door and the structure ajacent the door. Some of the disadvantages include a difficulty in manipulation, a weakness of the total structure where the weak point is usually found in the end attachment, and the fact that the end attachment on the doorframe side is usually attached to the door trim rather than a structural part; therefore they are not as reliable and strong as might be desired.

SUMMARY OF THE INVENTION

In order to aid in the understanding of this invention, it can be stated in essentially summary form that it is directed to a safety latch which permits limited opening of a door, with maximum security. The safety latch comprises a base securable to the door, with an intermediate like pivoted to the base and an outer link pivoted to the intermediate link. The outer link movably carries a latch which is engageable with a latchplate securable to the doorframe. However, in certain situations the positions of the latchplate and base may be interchanged.

It is thus an object to provide a safety latch which is economic of construction and is easy to use so that it may be used by the general populace for safety and convenience.

It is another object of this invention to provide a safety latch which engages between the door-mounted latch portion and the latchplate by turning a knob which engages the latch nose with the latchplate and permits the structure to unfold to limit the door opening to the length of the unfolded latch structure.

It is a further object to provide a safety latch with an outer link pivoted to an intermediate link which, in turn, is pivoted to a base which is securable to the door and has a latch which is movably mounted on the outer link for engagement with the latchplate.

It is still another object to provide a safety latch structure which is locked into a folded configuration against the door until it is used.

It is yet a further object to provide a safety latch which is used by turning a knob which extends a latch nose to engage with the latchplate and, at the same time, unlock the safety latch mechanism from its base.

The features of the present invention which are believed to be novel are set forth with particularity in the appended claims. The present invention, both as to its organization and manner of operation, together with

further objects and advantages thereof, may best be understood by making reference to the following description, taken in conjunction with the accompanying drawings, in which like reference characters refer to like elements in the several views.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a front-elevational view of the preferred embodiment of the safety latch of this invention shown in the folded and locked position;

FIG. **2** is a top-plan view thereof showing the door and a portion of the doorframe in section;

FIG. **3** is a section therethrough taken generally along the line **3—3** of FIG. **1;**

FIG. **4** is a front elevation of the latch similar to FIG. **1** showing the latch in an out-folded position with the latch nose in the engaged position;

FIG. **5** is a rear view of the safety latch, as seen in FIG. **4;**

FIG. **6** is a front-elevational view of another embodiment of the safety latch of this invention shown in the folded and iocked position;

FIG. **7** is a view thereof with the safety latch mechanism of FIG. **6** partly unfolded and with parts broken away and parts shown in section;

FIG. **8** is a bottom view of the outer link with parts broken away of the embodiment of FIG. **6;**

FIG. **9** is a top-plan view of still another embodiment of the safety latch of this invention showing the latch in its folded, but unlocked position;

FIG. **10** is a side-elevational view thereof showing the safety latch mechanism in a partly unfolded position;

FIG. **11** is a bottom-plan view of the outer link structure and a portion of the intermediate link structure of the safety latch of FIGS. **9** and **10;**

FIG. **12** is a front-elevational view of a further embodiment of the safety latch structure of this invention, particularly showing it in association with a base which incorporates a conventional doorknob and doorlatch structure;

FIG. **13** is an elevational view of the latchplate employed with the safety latch of FIG. **12;**

FIG. **14** is a partial view showing the safety latch of FIG. **12** in the unfolded, extended position; and

FIG. **15** is a rear view of the structure of FIG. **14.**

DESCRIPTION OF THE PREFERRED EMBODIMENTS

FIGS. **1** through **5** illustrate an embodiment **10** of the safety latch. Safety latch **10** comprises a base-mounted portion **14** for mounting upon a door **12** and a latchplate structure **16** for mounting upon doorframe **18.** Latchplate **16** has a flat, substantially planar portion **19** for surface-mounting or recess-mounting in the doorjamb. The inward end of latchplate **16,** that is the end extending toward the interior of the room, has a rolled edge **20** in the form of a cylindrical tube. The side of the cylindrical tube facing the base-mounted portion **14** has an opening **21** therein in the shape of the crossbar of a tee. The stem of the tee extends around the front of the rolled edge, and a portion of it is seen at **22** in FIG. **1.** The tee slot thus is wrapped around about 90° of rolled edge **20.** The tee slot is for engagement by the safety latch.

FIGS. **2** and **3** illustrate the base-mounted portion **14** in the folded and locked position. FIGS. **4** and **5** illustrate the same structure in the unfolded position, as if lying on a flat surface. Base-mounted portion **14** com-

prises base 24 which has suitable screwholes 26 for secure attachment of base 24 onto door 12. Base 24 has upturned flange edges 28 and 30. These flanged edges have a pivot pin hole at the end of the base toward the door edge, and pivot pin 32 extends through this hole.

Intermediate link 34 has a rolled end 36 thereon which embraces pivot pin 32. At its other end, it has a rolled end 38 which embraces pivot pin 40. Outer link 42, particularly see FIG. 5, has downturned flange edges 44 and 46. Pivot pin 40 passes through these downturned flanges to that the base and the two links are pivoted together for accordion-folding and expansion. As is seen in FIG. 2, the edge flanges 28,30 and 44,46 are complementary so that they can lie together when the base-mounted portion 14 of the safety latch is in the folded, locked position.

Disc 48 is positioned under outer link 42 and is rotated by knob 50 through a shaft 51 of square cross-section, which disc extends above the other link to be manually accessible when the safety latch is locked in the folded position. Latch disc 48 has tee 52 on one segment thereof. Adjacent the tee, latch disc 48 is provided with latch tongue 54. If desired, another latch tongue 56 is positioned opposite latch tongue 54; however one side 58 of latch disc 48 is flat, as seen in FIG. 5.

Latch disc 48 has three functions. First, when the flat side 58 of the latch disc is turned toward latchplate 16, the door is free to open unrestrained by safety latch 10. In this position of latch disc 48, its tee edge 52 engages into a slot 59 in a base-mounted lock post 60, see FIG. 3, to hold the intermediate and outer links 34 and 42 in a locked-down, folded position. This is the position seen in FIGS. 1 and 3. In its second function, with door 12 closed, latch disc 48 is turned a quarter turn so that either latch tongue 54 or 56 engages into the crossbar of the tee slot 21 in latchplate 16. Outer link 42 is still locked down, because the opposite latch tongue remains in the slot 59 in lock post 60. In this position, the door cannot be opened at all; thus safety latch 10 serves as a regular lock to hold the door in full closed position, as illustrated in FIG. 2.

In its third function, as best illustrated in FIGS. 4 and 5, latch disc 48 of the safety latch 10 is turned so that its tee 52 is engaged in the tee slot 21 in latchplate 16. In this position, flat side 58 is toward lock post 60 and thus the outer and intermediate links are unlocked from the base 24; however tee 52 is engaged in the stem portion 22 of the tee slot 21 in the latchplate 16. Now, when door 12 is swung open, outer link 42 and intermediate link 34 hinge outward to permit the door to open partway. With one end of the intermediate link pivoted on base 24 and the tee 52 locked into the tee slot 21 in the latchplate, the links unfold and limit the opening of the door. Thus limited opening security is achieved.

The strength of the safety latch structure is substantial because the latchplate 16 is secured to the strong part of the doorframe, and the base-mounted portion 14 is sturdy and securely attached. With the door 12 returned to the closed position, the links fold up and then knob 50 can be turned to swing either one of the latch tongues 54,56 or the flat side 58 toward the latchplate 16. This swings the tee 52 out of engagement and locks the outer link 42 down.

In order to allow the intermediate link 34 to fold down without engagement with the lock post 60, a hole 61 of relatively larger diameter is provided in the intermediate link. Also, the latch disc 48 is detented in its various positions by a α-shaped spring S encircling the square cross-sectional shaft 51 and anchored by a short outer link-mounted post P, as shown in FIG. 5.

FIGS. 6 through 8 illustrate safety latch 62 which is a presently preferred embodiment of the safety latch of this invention. Safety latch 62 has the same base 64, intermediate link 66, and outer link 68 as safety latch 10. The latch structure is slightly different in this species and comprises a sliding latch 70 positioned for sliding movement beneath the main plate 71 of outer link 68 and between the side flanges 72 thereof. Knob 73 has a pin 74 depending therefrom. Pin 74 extends through the main plate 71 of outer link 68 and through sliding latch 70. It retains the sliding latch in position by means of a washer 76 under the sliding latch. A sliding latch-mounted operating pin 77 extends upward through a slot 78 in the main plate 71 and engages in a radial slot 79 on the under side of knob 73. By this means, when knob 73 is turned a quarter turn, the sliding latch moves from its retracted position of FIG. 6 to its extended position in FIGS. 7 and 8. A slot 81 in the sliding latch 70 allows the plate 70 to slide without engagement with the pin 79. In the extended position, the nose of the latch 70 has a tee slot 80 which engages in complementary structure in its associated latchplate. Such suitable complementary structure is seen in the latchplate in FIGS. 12 and 13.

The lower end of pin 74 has a head 74*a* thereon which lies next to and engages with head 82*a* of lock pin 82. Lock pin 82 is secured to the base; however a portion 83 of the head on pin 74 is removed so that, when sliding latch 70 is in its extended position, pin 74 is unlocked from lock pin 82. However, when in the folded position, with sliding latch 70 retracted, pin 74 is turned to a position where the heads on the two pins interengage, and outer link 68 is locked down.

In FIGS. 9, 10 and 11, the safety latch of this invention is embodied as safety latch 84. Safety latch 84 has a base 86, intermediate link 88, and outer link 90. Similarly to safety latch 62, sliding latch 92, like latchplate 70 in safety latch 62, has a latch nose for interengagement with a suitable latchplate. The sliding latch 92 slides beneath outer link 90, and it is preferably moved from the inner, retracted position to the outer, latching position by means of operation of knob 94. Knob 94 is directly coupled by means of a shaft 95 movable along a slot 96 in the outer link 90 to sliding latch 92; thus knob 94 is simply thrust from one position to the other and slides, carrying the sliding latch with it. As in the previously described embodiments, the intermediate link 88 is provided with a lock post-accommodating hole 97.

As the sliding latch 92 moves from one terminal position to the other, it is retained by detent spring 99. Furthermore, locking of the outer link 90 is accomplished by upstanding T-headed lock post 98. When in the retracted position, lock fingers 100 of the sliding latch 92 engage around lock post 98 to restrain the outer link 90 in the folded, locked position when the latch nose is retracted. When the sliding latch 92 is extended, the outer link is unlocked at the same time the nose of the sliding latch engages in the latchplate. Again, unfolding to a limited extension is possible to limit opening of the door.

The safety latch of this invention is further embodies in safety latch 102, shown in FIGS. 12, 14 and 15. Safety latch 102 is quite similar to safety latch 62. It has a base 104, but compared to the base of safety latch 62,

base **104** is very much larger. In addition to serving as a base for intermediate link **106** which is pivoted thereon on pivot pin **108,** it serves also to carry a conventional doorknob structure which terminates in doorknob **110.** The doorknob can carry its own lock, as indicated by lock knob **112.** Interiorly of the door, the doorknob operates the conventional latch which engages into latch opening **114** in latchplate **116.** The latchplate is securely attached to a doorframe by screws **117.**

FIGS. **12** through **15** illustrate that any of the safety latch structures can be incorporated into a base **104** which also has the usual doorknob and door latch structures. In this arrangement, it serves as an additional safety latch which permits limited opening of the door. Safety latch **102** is illustrative of a particular safety latch structure, but any of the safety latches described above can be equally conveniently employed. Of course, appropriate arrangements of the lockdown structure would be necessary in such cases.

With respect to safety latch **102,** sliding latch **118** is slidably mounted underneath outer link **120** similarly to the structure of safety latch **62.** Sliding latch **118** has a latch nose **122** with a key slot **123** therein which is engageable into a complementary structure **124** in latchplate **116.** The latch nose **122** can be extended into the complementary slots only when the safety latch **102** lies in its folded position. Once extended, the angle between the nose **122** and the slots **124** in the latchplate retain the nose in the latchplate. Sliding latch **118** is moved from front to back by rotation of operating knob **126** in the same manner as described with respect to FIGS. **6** through **8.** Locking down of the outer link is accomplished by lock finger **128** on the rear end of sliding latch **118.** When in the folded position, retraction of sliding latch **118** causes lock finger **128** to pass underneath the adjacent portion **129** of the base to thereby lock the outer link **120** down into position. In this way, the safety latch **102** is locked down when it is not needed. As the sliding latch **118** is moved to the extended position, it unlocks the outer link **120** at the same time the latch nose **122** engages with its complementary slot **124** in the latchplate **116.**

From the foregoing, it should be evident that there has been described several safety latch constructions in accordance with different embodiments of the invention, all of which permit opening of a door a limited amount with maximum security.

It should be evident that the materials used to fabricate the embodiments of the invention are not critical and any material generally considered to be suitable for a particular application may be used. For example, various parts of the mechanism may be fabricated from brass, brassplated steel, aluminum, and possibly even some synthetic materials may be utilized. Also, any suitable manufacturing process, such as casting, machining, stamping, etc., may be used.

It should also be understood that although several embodiments of the invention have been described, the invention is susceptible to numerous modifications and embodiments within the ability of those skilled in the art and without the exercise of the inventive faculty. For example, the latchplate may be mounted on the door and the link mechanism mounted on the doorframe. Accordingly, all such modifications and embodiments are deemed to be within the spirit, scope and contemplation of this invention.

I claim:

1. A safety latch for limiting the amount of opening of a door member with respect to a doorframe member, said safety latch comprising:

a base for mounting on one of the door members adjacent the edge thereof;

an intermediate link pivotally mounted on said base;

an outer link pivotally mounted on said intermediate link, said base, said intermediate link, and said outer link being configured so that said outer link lies adjacent said base when said outer link is in its retracted position, and said outer link pivots outward away from said base to extend past said edge when in its extended position;

a latch movably mounted on said outer link;

a stationary latchplate for mounting on the other door member, said latch having a nose engageable in a latch slot in said latchplate only when said outer link is in its retracted position and said nose remaining latched in said latch slot as the door opens and said links unfold to a maximum limit position which limits the maximum door opening.

2. The safety latch of claim **1** wherein said outer link has a top panel and said latch is movably mounted on said outer link beneath said top panel.

3. The safety latch of claim **2** wherein a knob is positioned on the front of said outer link, said knob being connected to said latch to move said latch from its unlatched to its latched position.

4. The safety latch of claim **3** wherein said latch nose is a tee shaped nose for engagement in a tee slot in said latchplate, said latch further having a latch tongue thereon for engagement in the tee slot in said latchplate, said latch being pivotally mounted so that said tongue and said latch nose can be selectively engaged in said latchplate.

5. The safety latch of claim **3** wherein a lock pin interconnects said base and said outer link when said latch is in its retracted position.

6. The safety latch of claim **3** wherein said latch is a sliding latch slidably positionable from an extended position wherein its latch nose engages in an engagement slot in said latchplate to a retracted, unengaged position.

7. The safety latch of claim **6** wherein said base carries locking means thereon and said sliding latch engages said locking means for locking said outer link in the retracted position.

8. The safety latch of claim **7** wherein said base is a portion of a doorknob-mounting structure.

9. The safety latch of claim **3** wherein said base is a portion of a doorknob-mounting structure.

10. The safety latch of claim **1,** also comprising spring means associated with said latch and said outer link for indexing and biasing said latch.

* * * * *