

May 9, 1967

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3,318,625

LATCH FOR CLOSURES

Filed Feb. 16, 1965

3 Sheets-Sheet 1

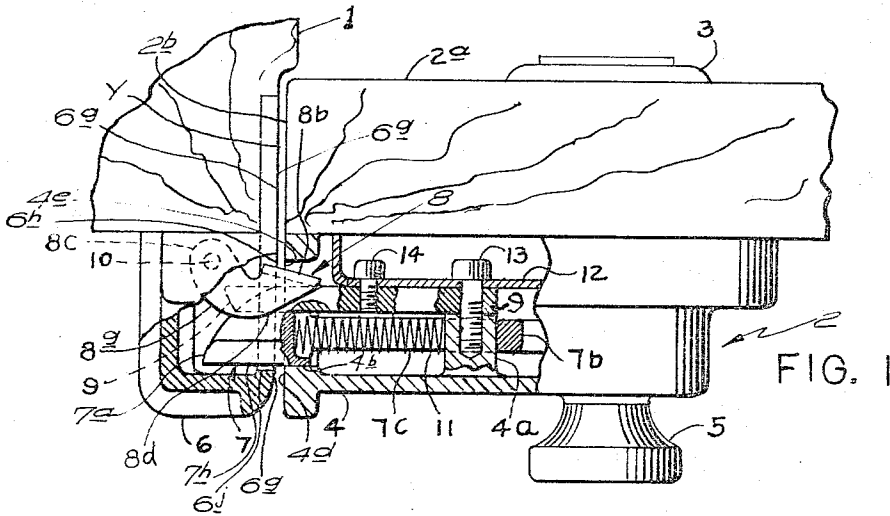


FIG. 1

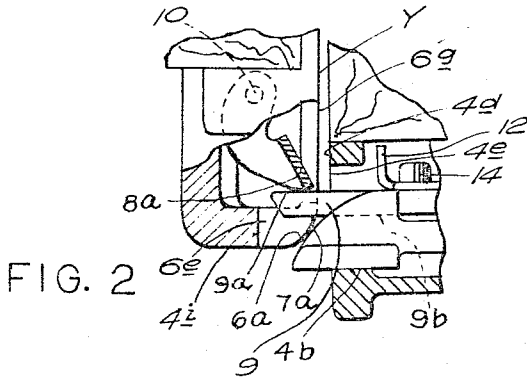


FIG. 2

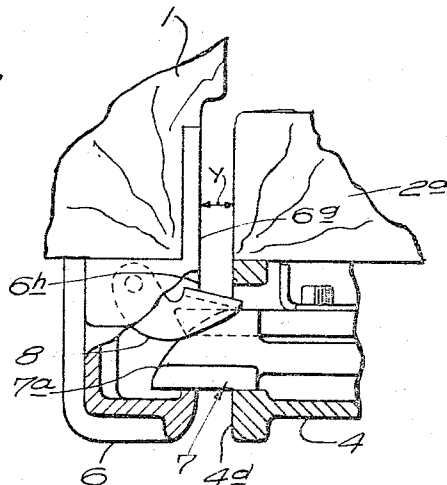


FIG. 3

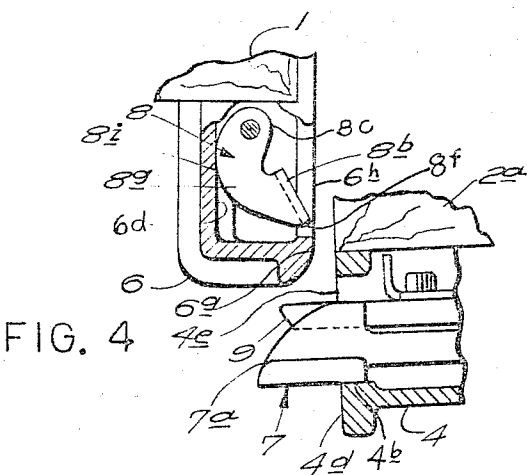


FIG. 4

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3 Sheets-Sheet 2

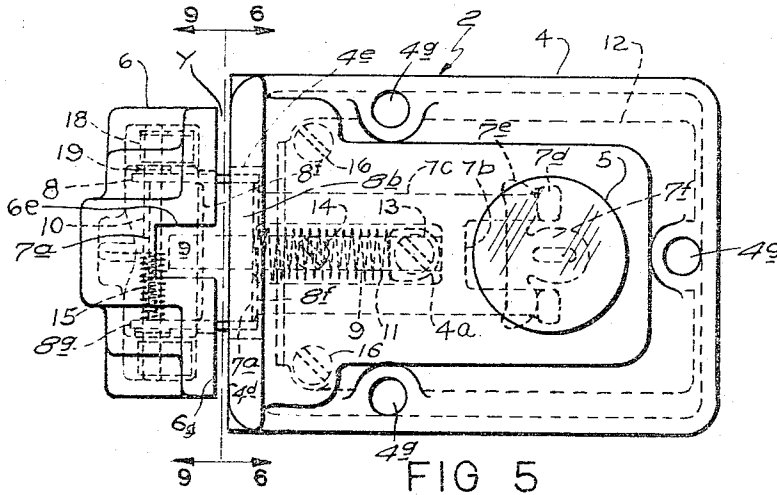


FIG 5

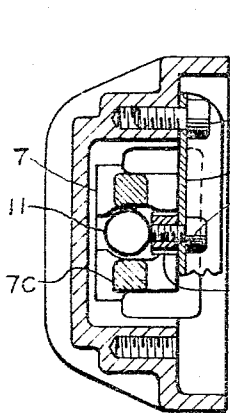


FIG 8

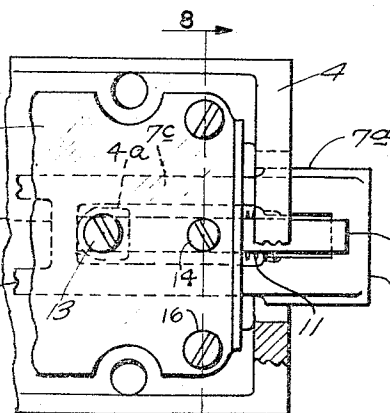


FIG 7

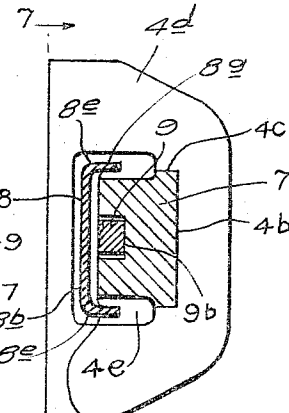


FIG 6

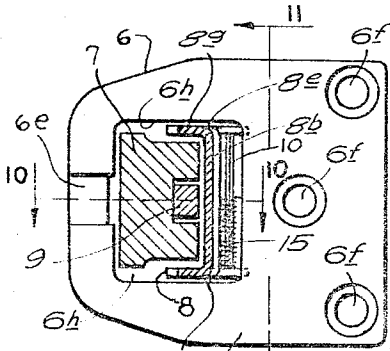


FIG 9

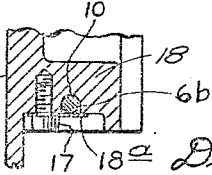


FIG 12

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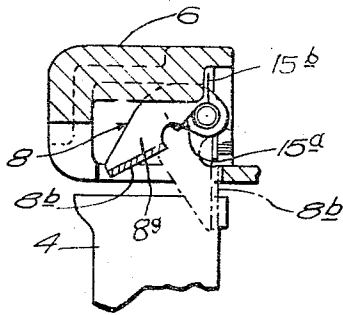


FIG. 10

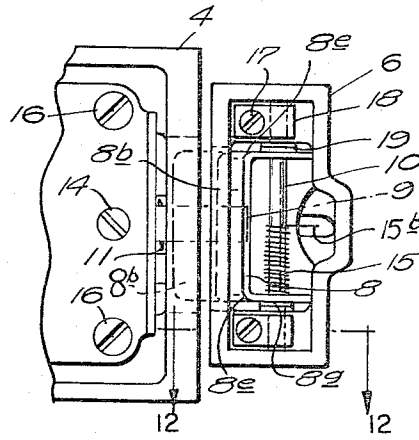


FIG. 11

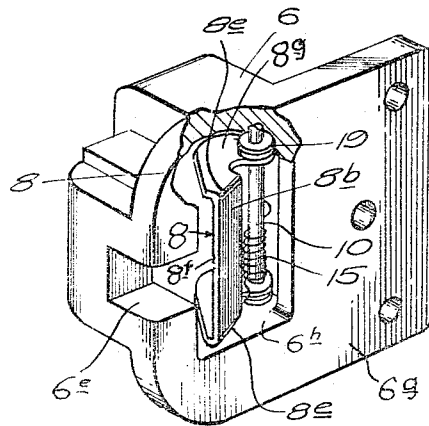


FIG. 13

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**LATCH FOR CLOSURES**

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10 Claims. (Cl. 292—346)

The common, ordinary door latch or night latch, which is mounted on the interior of the door, latches automatically when the door is closed. This is accomplished by means of a spring loaded bolt mounted on the door and having a cam surface at its end which, when the door is closed, engages a cam surface of the strike housing on the door jamb and is thereby forced back against its spring until the back or inner surface of the bolt end clears the lip of the strike housing to thereby bring the bolt opposite the bolt receiving opening in the strike housing at which time, due to pressure of the compressed spring, the bolt is forced into the opening in the strike housing and hence into locking engagement with the strike housing. This type of door lock is so designed that the door can be opened by withdrawing the bolt from the strike housing either by a key from outside or by a turning knob from the inside.

The automatic latching feature of this type of lock is highly desirable as it eliminates the necessity of locking by means of a key from the outside, as must be done with a dead bolt having no cam surface.

However, this type of automatic latch has an inherent weakness due to this very feature (cam surface on the bolt) which provides the automatic action. It is common knowledge that this type of lock with cam surface on the bolt can be easily forced open from the outside by means of a suitable thin sheet or pin of metal or plastic inserted from the outside between the door and the door jamb against the exposed cam surface of the bolt to pry the bolt out of the strike housing and thereby force open the door. Obviously, the wider the opening between door and jamb and the looser the bolt in the strike housing, the easier it is to force this type of lock. Although the door jamb in many cases has a lip partially or wholly blocking such opening, this lip can be easily whittled away or the sheet or pin of metal can be bent around the lip.

An object of the present invention is to overcome the above mentioned disadvantages of automatic latches or locks of the above type.

An object of the present invention is to provide a latch or lock having the aforesaid automatic latching feature by virtue of a cam surface on the bolt but which cannot be forced from the outside, as described above.

It is another object of the invention to provide a latch which retains the desirable automatic latching feature but in which the cam surface of the bolt is fully protected and shielded by a shield to provide an overlapping barrier so as to assure safety against the bolt being forced open from the outside even though the opening between door and jamb is fully exposed and regardless of the looseness of the bolt in the strike housing or the width of the opening.

Another object is to provide such a latch in which the shield mechanism is automatically actuated to shield the bolt when the door is closed and automatically latched but in which such shield mechanism is conveniently stored out of the way and concealed when the door is open.

Another object is to provide such a latch in which the shield mechanism is automatically returned to its stored out-of-the-way position when the bolt is released and the door is opened.

Another object is to provide such a latch which is simple and sturdy in construction and operation and which is inexpensive to manufacture. In fact, the safety

feature of the present invention can be built into conventional latch constructions at little or no additional expense. Furthermore, existing latches can be easily modified to incorporate the safety feature of the present invention.

Another object is to provide such a latch in which the shield mechanism is so designed that it is jam proof.

These objects are achieved in accordance with the present invention by means of a shield member which is normally stored out of the way in the lock housing but which is automatically moved from its normal position to bolt shield position by closing and automatically latching the door.

The shield member, when in shield position, covers and shields the normally exposed cam portion of the bolt located between the door and jamb. Means are provided for positively holding the shield member in bolt shield position so long as the door is closed and latched. However, when the door is unlatched, by key or by the inner unlatching knob, and opened the shield member automatically moves back to its normal position within the lock housing. The shield member is so located and held when in bolt shield position that there is no way in which the shield member can be forced out of shield position and while it is in shield position, there is no way in which the bolt can be forced open.

Further objects and advantages of the present invention will be apparent from the following description and accompanying drawings describing and showing, for purposes of illustration only, a preferred embodiment of the invention. In the drawings:

FIG. 1 is a plan view partially in section of a latch or lock embodying the present invention and mounted on a door;

FIG. 2 is a view like FIG. 1 of a part of the latch of FIG. 1 as the door is being closed;

FIG. 3 is a view like FIG. 1 of a part of the latch of FIG. 1 applied to a door having a relatively large opening Y between jamb and door;

FIG. 4 is a view like FIG. 3 with the door in open position but just prior to engagement of the bolt with the strike housing;

FIG. 5 is a front elevation of the lock of FIG. 1;

FIG. 6 is a view taken along the line 6—6 of FIG. 5;

FIG. 7 is a view taken along the line 7—7 of FIG. 6 with the strike housing removed;

FIG. 8 is a section taken along the line 8—8 of FIG. 7;

FIG. 9 is a view taken along the line 9—9 of FIG. 5;

FIG. 10 is a view taken along the line 10—10 of FIG. 9 with the bolt removed and with the shield member shown in broken lines when the bolt is received in the strike housing in lock position and in broken lines when the bolt is retracted from the strike housing;

FIG. 11 is a view taken along the line 11—11 of FIG. 9 with the bolt removed and with the shield member shown in broken lines when the bolt is received in the strike housing in lock position and in full lines when the bolt is retracted from the strike housing;

FIG. 12 is a view taken along the line 12—12 of FIG. 11;

FIG. 13 is a view corresponding to that of FIG. 9 but slightly in perspective, with the bolt withdrawn from the strike housing and with portions of the housing removed to better show the contour of the shield member.

With respect to the figures, 2 represents the latch or lock comprising a bolt housing 4 and strike housing 6, adapted to be secured in conventional manner to the door 2a and door casing jamb 1, respectively, as shown. The two housings 4 and 6 make up the latch or lock housing.

Slidably received within the bolt housing 4 is the bolt 7, normally biased by spring 11 to the position best shown

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in FIGS. 1, 3, 4, 5, 7 and 9 with the cam surface head end 7a protruding from the opening 4e in the end surface 4d of the bolt housing. The head 7a of bolt 7 extends into a pair of legs 7c (FIG. 5) which straddle a post 4a integral with the bolt housing 4. Spring 11 is biased between post 4a and the head 7a of the bolt, as shown in FIGS. 1 and 5. The legs 7c have a cross piece 7b which engages post 4a to limit outward axial movement of the bolt. The ends of legs 7b are provided with inwardly extending lugs 7d (FIG. 5) which cooperate with lugs 7e of the member 7f operated from inside by knob 5 to permit retraction of the bolt from inside. The same ends of the legs 7c also have lugs extending in an opposite outward direction (not shown) for cooperating in conventional manner with a key operated member from the outside (not shown) to retract the bolt into the bolt housing.

The inner portion of bolt head 7a is snugly but slidably received in the slot 4b, 4c in the bolt housing (FIG. 6).

Housing 4 is provided with a cover plate 12 which is secured to the bolt housing by means of screws 16 and screw 13, the latter of which is screwed into the post 4a, as shown in FIG. 1.

Rigidly secured to the inside of cover plate 12 by means of screws 13 and 14 is an elongated metal tongue 9 which is received in a slot 9b (FIG. 6) in the outer surface of bolt head 7a of bolt 7, as shown in FIGS. 1 and 6. The fit between tongue 9 and slot 9b is such as to permit longitudinal sliding movement of the bolt with respect to the tongue. The tongue 9 and the surfaces 4b and 4c and the periphery of post 4a act as guide surfaces for axial sliding movement of the bolt in the bolt housing.

The tongue 9 also protrudes from opening 4e in end surface 4d of the bolt housing but not as far as the cam surface head 7a of the bolt.

The bolt housing is secured to the inside of the edge portion of door 2a by means of the holes 4g with the bolt head 7a and the tongue 9 protruding outwardly from the edge 2b of the door, as shown.

Strike housing 6 is secured to the door jamb 1 in conventional manner, as shown in FIGS. 1 to 5 at the same level as the bolt housing 4 and with the end surface 6g facing and in close relationship with the end surface 4d of the bolt housing when the door is closed. Surface 6g of the strike housing is provided with an opening 6h (FIG. 9), which faces and is aligned with opening 4e of the bolt housing when the door is closed.

The inner wall 4i (FIG. 2) of the strike housing adjacent the end surface 6g has a passage 6e therein extending into the interior of the strike housing, such passage comprising a slot in the surface 6g extending from the inner edge thereof to the opening 6h, as shown in FIGS. 2, 5, 9 and 10.

The inner corner of the strike housing facing the bolt housing is provided with a cam surface 6a for cooperating with the cam surface 7a of the bolt head as will be described in greater detail hereinafter.

Pivotally mounted within the strike housing 6 by means of vertically disposed pivot pin 10 is a generally channular shaped metallic shield member 8 comprising an elongated base plate 8b having a pair of opposite side edges 8e and a pair of opposite elongated end edges 8f. Base plate 8 has a pair of upstanding parallel walls or ears 8g extending from the side edges 8e thereof. Ears 8g extend away from the plane of the base plate and edgewise beyond an end edge 8f of base plate 8b and then back toward the plane in which the base plate 8b lies, as shown in FIGS. 1 to 4 and 10. Actually, the walls 8g curve in an edgewise direction. Pivot pin 10 extends through holes in the opposed walls 8g, as shown. The ends of pin 10 are received in slots 6b in a pair of lugs 18 located within and integral with the strike housing, as shown, one lug being at the upper end of the interior of the strike casing and the other lug being at the lower end. The ends of the pin are retained in such slots by means of plates 18a secured to the lugs 18 by means of screws 17 (See FIGS. 11 and 12).

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Spacer washers 19 (FIG. 11) are provided around the pin 20 between the lugs 18 and the walls 8g of the shield member.

It is noted that the pivot pin 10 is located in the vicinity of the outer corner of the interior of the strike housing located away from the bolt housing and the shield member 8 extends diagonally in the housing interior toward the opposite inner corner adjacent the bolt housing with the plane of the base plate being diagonally disposed in this fashion. The end edge 8f of such base plate away from the pivot pin is about flush with the surface 6 of the strike housing closely adjacent the inner end of slot 6e. The diagonally disposed base plate lies opposite the inner end of slot 6e.

A coil spring 15 is located around an end portion of the pin 10 with one end 15a (FIG. 10) anchored to one of the ears 8g and the other end 15b anchored to the strike housing, as shown in FIG. 10, to bias the shield member 8 about its pivot axis 10 to the position shown in FIG. 4 and in FIGS. 10 and 11 in which the curved edges 8i (FIG. 4) of the ears 8g engage the inner wall of the strike housing.

When the open door (FIG. 4) is swung closed, the tongue 9 is moved laterally through the slot 6e into the interior of the strike housing and into engagement with the surface 8a (FIG. 2) of base plate 8b to move the shield member 8 in a counterclockwise direction about its pivot axis 10 from its normal position shown in FIG. 4 to its bolt shield position, as shown in FIG. 1. The same closing of the door causes the cam surface 7a of the bolt 7 to engage the cam surface 6a of the strike housing to force the bolt 7 back into the bolt housing against the force of spring 11 until the bolt clears the cam surface 6a at which time the openings 4e and 6h of the bolt housing and strike housing, respectively, are brought into alignment and the bolt head is forced into the opening 6h of the strike housing to lock position, as shown in FIG. 1. In this position the door is locked in close position by engagement of inner locking edge 7h (FIG. 1) of the bolt head with the interior wall 6j of the strike housing.

It is noted that the aforesaid pivotal movement of the shield member 8 moves the base plate 8b out of the opening 6h of the strike housing into the opening 4e of the bolt housing and the sizes of these openings should be sufficient to permit this swiveling movement of the shield member with sufficient room to permit reasonable vertical misalignment of the bolt housing and strike housing.

It is also noted that when the shield member is moved to bolt shield position, the base plate 8b extends from within the opening 6h of the strike housing across the gap Y between the opposed surfaces 6g and 4d of the strike housing and bolt housing respectively and into opening 4e of the bolt housing. The base plate 8b thus covers the entire exposed outside surface of the cam surface bolt head between such surfaces and the ears 8 extend inwardly along the upper and lower surfaces of the bolt head to completely shield the bolt head from the outside and hence against contact with any object inserted from outside into the gap Y between door and jamb.

In order to perform this function, the elongated length or height of the base plate is made slightly greater than the height (width) of the bolt head and the shorter width of the base plate is made greater than the width of the gap Y. The distance (length) between legs 8g of the shield member should be sufficient to receive the bolt head 7a therebetween even with reasonable misalignment of the bolt housing and strike housing. By making the width of the base plate sufficiently wide, it will be capable of traversing relatively wide gaps between the door and jamb, as well as gaps of smaller width.

Upon retracting the bolt 7 from strike housing 6 by rotating knob 5 to unlock the door, the door can be opened. Opening movement of the door moves the tongue 9 laterally out of the interior of the strike housing and back through the slot 6e, whereupon the spring 11 auto-

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matically moves the shield member back to its normal position out of the way within the strike housing, where it is concealed.

Since the protruding tongue 9 protrudes with the bolt, it is hardly noticeable and does not get in the way.

It is noted that when the latch is locked and the shield member is in bolt shield position, it is supported along its entire length by the tongue 9 and bolt 7 under all conditions.

The door cannot be closed without the shield member being brought into effective bolt shield position even if the spring 15 were to fail.

Even if the spring 15 fails, the door cannot jam since the swing of the door, when opened, will automatically push the shield member into the strike housing.

I claim:

1. A lock for locking a closure member to a casing therefor, said lock comprising housing means comprising a latch bolt housing adapted to be mounted on one of said closure member and casing and a strike housing adapted to be mounted on the other, said lock also comprising a latch bolt slidably mounted in an opening in a surface of said bolt housing and having a cam surface at its end, said bolt being normally biased to a position in which its cam end protrudes from said opening, said strike housing also having an opening in a surface thereof for receiving said cam end of said bolt when said closure member is in close position with respect to said casing, said openings of said housings being moved into alignment when said closure member is moved to close position, said cam end being adapted to be moved laterally into engagement with said strike housing to force said bolt back into said bolt housing when said closure member is moved to said close position until said openings are brought into alignment whereupon said cam end of said bolt is urged into said strike housing opening to lock said closure member in close position, said bolt extending from said opening in said bolt housing into said opening in said strike housing when in lock position, the improvement comprising a shield member mounted in said housing means for shielding said cam surface of said bolt located between said openings from tampering from the outside when said bolt is in lock position, means for mounting said shield member in said housing means for movement from a normal position within one of said housings when said closure is in open position to a bolt shielding position, in which it extends between said openings and is located outwardly of said bolt to shield said bolt, when said closure member and bolt are in closed and lock positions respectively, said lock including means mounted in the other housing and responsive to movement of said closure member to close position to move said shield from said normal position to said bolt shield position and to hold it in said bolt shield position while said closure member remains in closed position, said shield member being pivotally mounted in said strike housing, said movement of said shield member being a pivotally movement, and said means for moving said shield member comprising a tongue secured to said bolt housing, said tongue being adapted to engage said shield member and force it from its normal position to bolt shielding position when said closure member is moved to close position.

2. A lock according to claim 1, said tongue protruding out of said opening in said bolt housing, said strike housing having a passage extending through the inner wall to the interior thereof, said passage comprising a slot located in said surface of said strike housing and extending from the inner edge of said surface of said strike housing to said opening in said surface of said strike housing, said tongue being adapted to be moved laterally through said slot into said strike housing and into engagement with said shield member upon movement of said closure member

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to close position to thereby pivot said shield member from its normal position to bolt shield position.

3. A lock according to claim 2, said shield member comprising a base plate having a pair of opposite side edges and a pair of opposite end edges, a pair of parallel side walls which extend from said opposite side edges and which are pivotally connected to said strike housing for said pivotal movement of said shield member, the pivot axis of said pivotal connection being spaced from said base plate.

4. A lock according to claim 3, the portion of said bolt located between said openings in said housing when said bolt is in lock position being embraced by said shield member with said base plate covering the outwardly facing surface of said bolt between said openings and with said parallel side walls extending inwardly along the upper and lower surfaces of said bolt.

5. A lock according to claim 4, said base plate extending out of the said opening in the strike housing across any gap between said openings and into the opening in said bolt housing when said shield member is located in bolt shield position.

6. A lock according to claim 5, said shield member being pivotable in an outward direction about an axis generally normal to the longitudinal axis of said bolt and to the direction of said slot.

7. A lock according to claim 6, said side walls extending from said side edges of said base plate away from the plane of said base plate and also in an edgewise direction away from said bolt housing and beyond an end edge of said base plate and then in a direction back toward the plane in which said base plate lies.

8. A lock according to claim 7, said pivot axis extending through said side walls at a point substantially in the plane in which said base plate lies but spaced from said base plate.

9. A lock according to claim 7, said pivot axis being located in the vicinity of the outer corner of the interior of said housing located away from said slotted surface of said strike housing, said shield member normally extending in a diagonal direction from its pivot axis to the inner corner of said interior located adjacent said surface of said strike housing with said base plate located across and opposite the inner end of said slot, whereby when said tongue is moved laterally in an outward direction through said slot and into the interior of said strike housing, it engages said base plate and moves it outwardly about its pivot axis out of said opening in said strike housing to a position in which it spans the gap between said surfaces of said housings and in which an end portion thereof is moved into said opening of said bolt housing, said end of said bolt being located in said strike housing between said base plate and said slot when said bolt is in lock position and said shield member is in bolt shield position.

10. A lock according to claim 9, said tongue being moved laterally out of engagement with said shield member and through said slot out of said strike housing upon movement of said closure member from close to open position, said lock embodying means for automatically returning said shield to its normal position within said strike housing upon withdrawal of said tongue from said strike housing.

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