

July 24, 1962

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3,046,042

LATCHBOLT EXTENSION

Filed July 27, 1959

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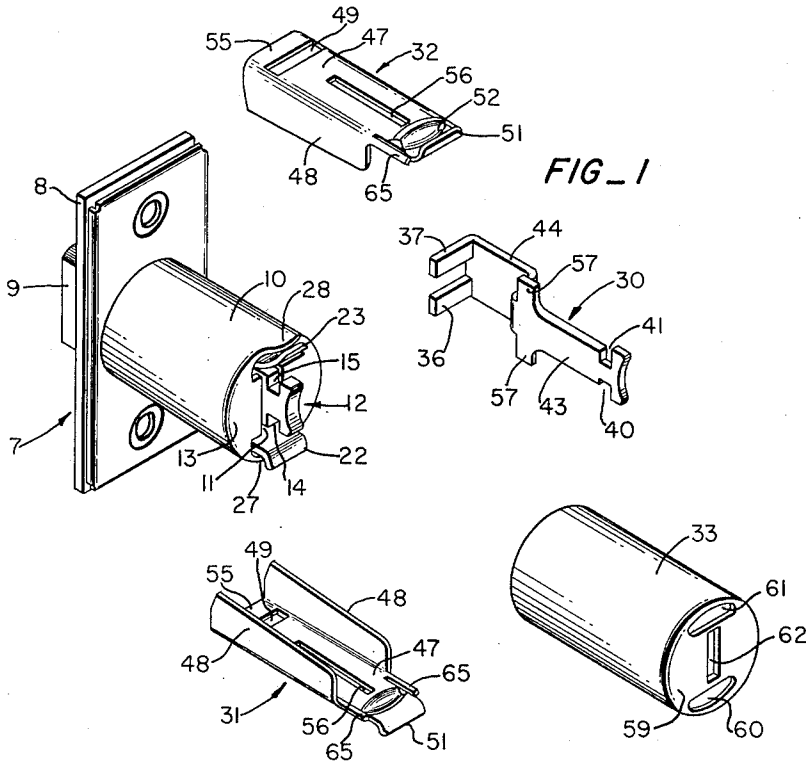
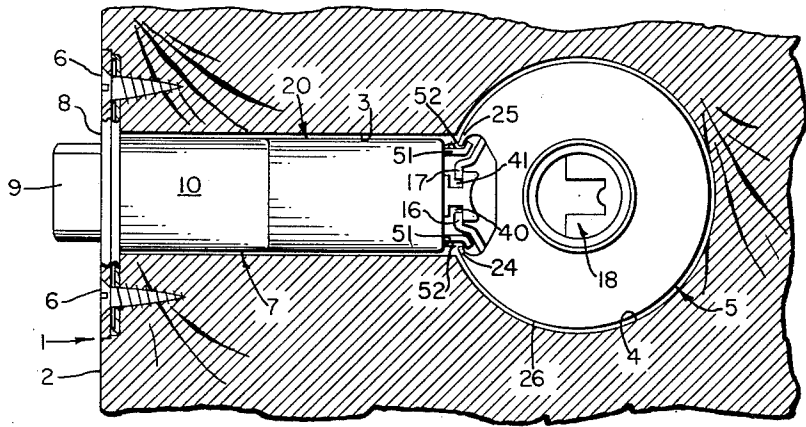


FIG. 2



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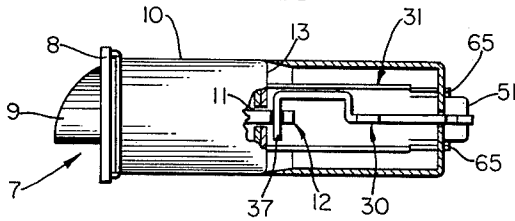
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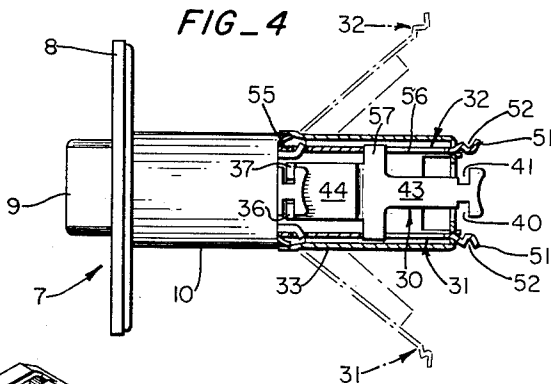
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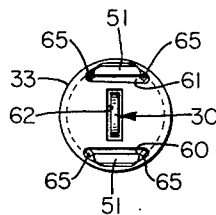
FIG_3



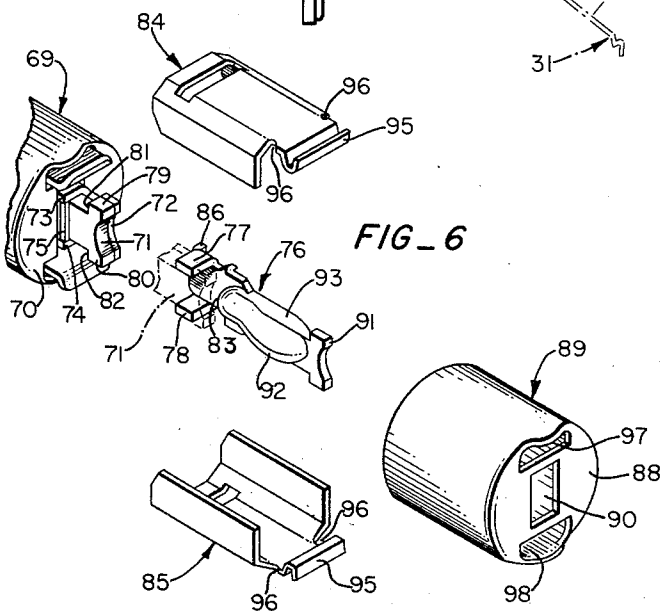
FIG_4



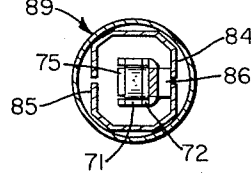
FIG_5



FIG_6



FIG_7



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LATCHBOLT EXTENSION

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Filed July 27, 1959, Ser. No. 829,824
10 Claims. (Cl. 292-1)

This invention relates to a latchset and more particularly to a means for increasing the backset of a latch unit.

The term "backset" designates the distance between the edge of the door through which the latchbolt projects and the axis of the spindle which carries the door knobs. Heretofore various types of backset extension units have been evolved to permit the door knobs of a latchset to be placed at a greater distance from the edge of the door than is provided by conventional latchbolt units. Examples of such prior art devices are shown in Schlage Patent No. 2,299,181 of October 20, 1942, and Schlage Patent No. 2,250,036 of July 22, 1941.

Such prior art "backset links" generally consist of a housing adapted to fit within the bore in the door that receives the latchbolt housing and in which housing a bar is slidably disposed. Said bar connects at one end with the retractor bar of the latchbolt and at the other end with the retractor of the latch bolt actuating unit so that actuation of the retractor retracts the latchbolt.

The procedure in employing such prior art backset links is for the user to purchase the backset link separately and assemble the same with the latchset at the time of installation. Such a procedure has the disadvantage that the assembly may not be made properly by the person who installs the lock. Furthermore, in order to make the installation a simple and speedy procedure for unskilled workmen, clearances between cooperating parts must be made relatively large, thereby impairing, in many instances, the smooth operation of the latchset or lockset.

An additional disadvantage inherent in conventional installations requiring a backset link extension is that a separate part, that is the backset link itself, must be handled many times between the point of manufacture and its ultimate use, thus increasing the likelihood of the same becoming damaged or misplaced.

The main object of the present invention is the provision of a novel means for increasing the backset of a latchset and which means overcomes the disadvantages of prior art devices of like nature.

Another object of the invention is the provision of a latchbolt extension which is adapted to be assembled by the manufacturer with the latchbolt unit itself so that no separate extension device is required.

Still another object of the invention is the provision of a latchbolt extension which permits a manufacturer to make a latchbolt unit of standard length and to assemble therewith latchbolt extension units of various sizes to provide a backset of any desired length. It will subsequently be apparent that two or more such extension units may be provided if desired.

Yet another object of the invention is the provision of an improved latchbolt extension unit which may be readily assembled with a standard latchbolt unit so that said standard latchbolt and extension may be handled and used as one unit.

Other objects and advantages will be apparent from the following specification and from the drawings.

FIG. 1 is an exploded perspective of the various parts of the invention and the latchbolt unit with which they are assembled in spaced apart relationship.

FIG. 2 is a vertical section in the plane of the door showing the latchbolt actuating unit, the latchbolt unit

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and the latchbolt extension unit in assembled operating position in the door.

FIG. 3 is a side elevation of a latchbolt unit with the invention assembled therewith and shown in section and with portions of the latchbolt unit broken away to show internal structure.

FIG. 4 is a view similar to FIG. 3 but taken at right angles thereto.

FIG. 5 is an end view of the assembled latchbolt extension unit.

FIG. 6 is an exploded perspective of a modified form of latch bar extension and housing.

FIG. 7 is a cross section through the assembled extension of FIG. 6.

The invention is adapted to be employed in a door 1 having an edge 2 from which a bore 3 extends inwardly to a transversely extending larger bore 4 between the opposite faces of the door. The bore 4 is adapted to receive therein the latchbolt actuating unit generally designated 5.

The latchbolt unit generally designated 7 (FIG. 1) comprises a face plate 8 which is secured by screws 6 to the edge 2 of the door 1 and through which plate the latchbolt 9 projects. Said unit also includes a cylindrical housing 10 which is received in bore 3 (FIG. 2). The inner endwall 13 of housing 10 is provided with a slot 11 through which is slidably received the inner end of the latch bar 12. It will be understood that the latch bar 12 is secured at its outer end to the latchbolt 9 and both are urged outwardly to the projected position of FIG. 2 by a compression spring (not shown) within housing 10.

In the usual assembly of the latchset when no extension is employed the bore 3 is substantially shorter than shown in FIG. 2 and latchbolt unit 7 is connected directly to the latchbolt actuating unit 5. For this purpose the inner end of latch bar 12 is provided with a pair of oppositely outwardly opening notches 14, 15 (FIG. 1) which are adapted to receive therein fingers 16, 17 respectively formed on the retractor 18 (FIG. 2). When the units are thus assembled, movement of the retractor 18 to the right in FIG. 2 in response to rotation of the knob spindle retracts the bolt 9 inwardly of the housing 10.

In the conventional assembly of latchbolt unit 7 and latchbolt actuating unit 5 a connection between the housings of said units is effected by means of a pair of out turned hooks 22, 23 on inner endwall 13 of housing 10 which are adapted to fit behind a pair of opposed shoulders 24, 25 formed on the cylindrical housing 26 of latchbolt actuating unit 5. Housing 10 is also provided with a pair of extensions or tabs 27, 28 which are adapted to engage the outer periphery of housing 26 to prevent inward movement of latchbolt housing 10. Outward movement of housing 10 is, of course, prevented by hooks 22, 23.

By the present invention a latchbolt extension unit generally designated 20 is interposed between the latchbolt unit 10 and the retractor 18 as shown in FIG. 2. As will be subsequently seen, said extension unit is carried by latchbolt unit 7 so that, for all practical purposes, a new latchbolt unit of substantially greater length is provided.

As best seen in FIG. 1, latchbolt extension unit 20 consists of a latch bar extension 30, a pair of similar extension links 31, 32 and a cylindrical housing 33.

Latch bar extension 30 may be stamped from a section of sheet material and is formed at one end with a pair of fingers 36, 37 which are adapted to be received within the notches 14, 15 respectively of the latch bar 12. The opposite end of extension bar 30 is substantially identical in shape to the inner end of latch bar 12 and is similarly provided with a pair of notches 40, 41 which

are adapted to receive therein fingers 16, 17 of the retractor 18 (FIG. 2).

Between its opposite ends said extension bar 30 is provided with an axially extending portion 43 and an offset portion 44, the latter being required to provide clearance for the inner end of latch bar 12. As seen in FIGS. 3, 4 the extension bar 30 is connected with latch bar 12 simply by inserting fingers 36, 37 into notches 14, 15 of said latch bar.

The extension link 32 is generally channel shaped having a web 47 and a pair of side flanges 48. Adjacent the outer end of web 47 the same is provided with a slot 49 which is adapted to receive therein the out turned lug 23 of latch unit 7. The opposite or inner end of link 32 is formed to provide a lug 51 which is similar to lug 23 in order to fit behind the shoulder 25 of housing 5 (FIG. 2). To provide an effective positioning means for firmly positioning link 32 relative to housing 26 the inner end of link 32 adjacent lug 51 is joggled as best seen in FIGS. 1, 4 so as to provide an outwardly opening groove 52 for receiving said shoulder 25 therein.

Link 31 is identical to the above described link 32 and the same numerals are used in FIG. 1 to indicate the same parts thereof. Link 31 of course cooperates with lug 22 on latch unit 7 and with shoulder 24 on housing 26 in the same manner as link 32 cooperates with lug 23 and shoulder 25.

Links 31, 32 may be secured in place relative to housing 10 of latchbolt unit 7 by tilting said links to about the positions indicated in dotted lines in FIG. 4 so that the inner end of link 31 may be inserted between tab 27 and lug 22 (FIG. 1). It is then merely necessary to swing said links to the full line positions of FIG. 4 in which positions they extend axially of latchbolt housing 10.

At this point it should be noted that the slot 49 in said extension links 31, 32 is positioned so that the inner end portion 55 between said slot and the adjacent end of the link fits snugly between the inner endwall 13 of housing 10 and the hook portion of lug 22 (FIG. 4). By this structure it is seen that links 31, 32 function, in effect, the same as rigid extensions of housing 10. However, when said extension links are swung to the dotted line positions of FIG. 4 they may be removed or inserted as desired.

The webs 47 of the extension links 31, 32 are also provided with longitudinally extending slots 56 which are adapted to receive therein laterally projecting tabs 57 integral with axial portion 43 of extension bar 30 when the links and bar are assembled with the latchbolt unit as seen in FIG. 4. In this manner an effective guide means is provided for holding extension bar 30 in its axially extending position during reciprocation thereof.

The assembly of the latchbolt extension is completed by the cylindrical housing 33 which is open at its outer end and closed by an endwall 59 at its inner end. Said endwall is provided with a pair of openings 60, 61 for receiving lugs 51 therethrough and with a central opening 62 for receiving the inner end of extension bar 30. When the housing 33 is applied over bar 30 and links 31, 32 as seen in FIGS. 2, 3, 4 the latchbolt unit is thus lengthened by the length of said housing 33.

In order to firmly secure the extension unit 20 on latchbolt unit 7 a pair of fingers 65 are struck from the flanges 48 of each of the extension links 31, 32, and after assembly of the parts as above described said fingers 65 are bent toward each other and inserted between the lug 51 and the inner edge of the openings 61 as best seen in FIG. 5. In this manner the housing 33 is firmly anchored to the extension links 31, 32 which in turn are fixedly secured to housing 10 of the latchbolt unit as noted above. The use of fingers 65 also results in the lugs 51 being spaced apart the proper predetermined distance to suit the spacing between the shoulders 24, 25

on housing 26, since said fingers force the lugs against the outer edges of openings 60, 61.

It will be apparent that when assembled as above described the latchbolt extension 20 and the latchbolt unit 7 are, for all practical purposes, a unitary latchbolt unit and it is not necessary for the person installing the latchset to perform any operations in addition to those required when only the latchbolt unit 7 is installed with the latchset.

The structure of FIGS. 1-5 lends itself, without modification, to a latchbolt which is provided with a deadlocking means. In such a case the bar link, which is formed at its inner end in somewhat the same manner as the inner end of latch bar 12 is also engaged by the fingers 36, 37 of the latch bar extension 30. The plunger cam bar which is merely a narrow bar is adapted to fit between the fingers 36, 37 so that its normal operation is unaffected by the presence of such fingers.

In certain instances in which the latch bar extension is relatively short and the function of the lockset is such that depression of the latchbar actuates an unlocking means in the latchbolt actuating unit it is desirable to use a modified construction such as that shown in FIGS. 6, 7.

In this case the inner end 70 of the latchbolt housing 69 is adapted to receive therethrough the latch bar 71 and the bar link 72 which is provided with upper and lower laterally directed flanges 73, 74. Slidably supported alongside latchbar 71 and between said flanges is a plunger cam bar 75 which is connected to the deadlocking bolt (not shown) so that said bar 75 moves inwardly relative to the edge of the door when the door is closed.

The retractor bar extension generally designated 76 is somewhat similar at its outer end to extension 30 of FIG. 1 in that it is formed with a pair of upper and lower fingers 77, 78. However, in this case the latchbar 71 is not notched in the manner of latchbar 12, but is merely provided with a pair of laterally directed projections 79, 80 thus forming shoulders 81, 82 respectively. Upon inward movement of latchbar extension 76 it will be apparent the fingers 77, 78 engaging shoulders 81, 82 cause corresponding inward movement of latchbar 71. However, inward movement of latchbar 71 does not immediately result in movement of latchbar extension 76 because no notch corresponding to notches 14, 15 of FIG. 1 exists in the latchbar 71. The reason for this is that in the arrangement of FIGS. 6, 7 the lockset is not unlocked by inward movement of the retractor, but rather by a separate unlocking device (not shown) which is actuated by the inner end of the latchbar 71 when the latter moves inwardly in response to the latchbolt being depressed when the door is closed.

In order to unlock the lockset when the door is closed in the arrangement of FIG. 6 the latchbar extension 76 is bent to provide a shoulder 83 which is engaged by the inner end of latchbar 71 when the latch is depressed. With the latchbar 71 in its assembled normal position with extension 76 as indicated by dotted lines in FIG. 6 it will be noted that the shoulder 83 is spaced inwardly from the inner end of the latchbar. Thus, some lost motion is provided before the extension 76 moves inwardly in response to inward movement of the latchbar 71. Such lost motion, which results in movement of latchbar 71 relative to bar link 72 is required to permit the deadlocking mechanism to operate. However, since bar link 72 is formed at its inner end to a shape identical to latchbar 71 no lost motion exists when the latchbolt is depressed in response to inward movement of latchbar extension 76 when the door is opened by turning the knob of the lockset.

In the arrangement of FIG. 6 extension links 84, 85 may be provided having the same function as extension links 31, 32. However, in the device of FIG. 6 effective guiding of latchbar extension 76 may be achieved without providing slots similar to slots 56 of FIG. 1. As best seen in FIG. 7 latchbar extension 76 is provided with a laterally projecting lug 86 which is of sufficient width to

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engage the adjacent extension links 84, 85 thus preventing fingers 77, 78 from being withdrawn from retractor bar 71 and bar link 72. During reciprocation of extension bar 76 lug 86 thus guides the same so that it remains coaxial with the latchbolt housing.

As stated above the arrangement of FIG. 6 is effective when the extension desired is relatively short. In such a case the throw of latchbar 71 may carry the inner end of the same to the inner end wall 88 of sleeve housing 89 or to a point adjacent thereto. In such a case it is necessary to form an opening 90 in said end wall 88 of sufficient width to accommodate the outer end of extension 76. Since the shortness of sleeve 89 may also make impossible the use of guiding tabs such as those shown at 57 in FIG. 1, it is necessary to provide some means for guiding the free end 91 of latchbar extension 76 so that it remains coaxial with the housing 89 for actuating the unlocking means in the latchbolt actuating means. This is done in the structure of FIG. 6 by enlarging the cross sectional extent of said extension 76 in the manner shown in FIG. 6.

If the latchbar extension 76 is stamped out of sheet metal, which is preferable, it may be bulged outwardly, at one side to provide a projection 92 and formed with flanges, one of which is indicated at 93, at its opposite side, thus effectively increasing the cross sectional extent of the latchbar extension so that the same is guided by the sides of opening 90.

FIG. 6 also discloses a method of fixedly but releasably securing the latchbolt extension to the latchbolt housing without deforming the extension links. The extension links 84, 85 are provided with lugs 95 which are similar in function to lugs 51 of FIG. 1. Said lugs 95 are provided with recesses 96 at the junctures of said lugs with the body portion of extension links 84, 85. The openings 97, 98 in the end wall 88 of sleeve housing 89 are formed so that upon assembly the edges of said openings 97, 98 snap into recesses 96 thus effectively securing sleeve 89 to the latchbolt housing 69 by the resiliency of the extension links 84, 85. To enhance this holding effect the extension links 84, 85 are formed so that the same must be urged toward each other when passing through openings 97, 98 at assembly.

It will be noted in both forms of the invention that the presence of the latchbolt extension does not in any way affect the normal operation of the lockset and that for all practical purposes the assembly operates in exactly the same manner as the latchbolt unit itself.

The very specific description of the preferred forms of the invention should not be taken as restrictive thereof since modifications in design will occur to those skilled in the art without departing from the scope of the invention as defined in the following claims.

I claim:

1. In combination with a latchset including a retractor and a housing therefor and provided with a retractor bar and a cylindrical latchbolt housing in which said bar is reciprocable, a latchbolt extension unit for extending the effective length of said retractor bar comprising: a retractor bar extension secured at one end to said retractor bar and formed at its other end to engage said retractor, a pair of extension links formed at one of their corresponding ends to connect with said latchbolt housing and at their opposite corresponding ends to connect with said retractor housing, said retractor bar extension being slidably received in said links and a tubular extension housing extending between said latchbolt housing and said opposite ends of said extension links for holding the latter together as a unit.

2. In combination with a latchset including a retractor and a housing therefor and provided with a retractor bar and a cylindrical latchbolt housing in which said bar is reciprocable, a latchbolt extension unit for extending the effective length of said retractor bar comprising: a retractor bar extension secured at one end to said retractor bar and formed at its other end to engage said retractor, a pair of extension links formed at one of their corre-

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sponding ends to connect with said latchbolt housing and at their opposite corresponding ends to connect with said retractor housing, said retractor bar extension being slidably received in said links and a tubular extension housing extending between said latchbolt housing and said opposite ends of said extension links for holding the latter together as a unit, said opposite ends of said extension links and said extension housing being provided with interengaging elements to permit said extension housing and said links to be secured together by their own resiliency.

3. In combination with a latchset that includes a latchbolt actuating unit having a housing and a retractor reciprocable therein, and that further includes a retractor bar and a cylindrical latchbolt housing in which said bar is reciprocable, said latchbolt housing being provided with a pair of spaced out turned lugs adapted to engage the housing of said actuating unit, a latchbolt extension unit for extending the effective length of said retractor bar comprising: a retractor bar extension secured at one end to said retractor bar and formed at its other end to connect with said retractor, a pair of extension links formed at one of their corresponding ends to connect with said lugs and at their opposite corresponding ends to connect with said retractor housing, said retractor bar extension being slidably received in said links and a tubular housing fitted over said links and extending between said latchbolt housing and said opposite ends of said extension links for holding the latter together as a unit.

4. In combination with a lockset including a retractor and a housing therefor and provided with a retractor bar connected to the latchbolt of the lockset and a cylindrical latchbolt housing in which said bar is reciprocable, a latchbolt extension unit for extending the effective length of said retractor bar comprising: a retractor bar extension connected at one end to said retractor bar for retracting the latter upon inward movement of said extension, an extension link formed at one end for connection to the inner end of said latchbolt housing and at its opposite end for connection to the retractor housing, said retractor bar extension being provided with a laterally projecting lug engageable with said link for holding said retractor bar extension coaxial with said latchbolt housing during movement of said retractor bar extension, and means surrounding said extension link and said retractor bar extension and secured to said latch bolt housing for holding said link and retractor bar extension together as a unit.

5. In combination with a latchset including a retractor and a housing therefor and provided with a retractor bar and a cylindrical latchbolt housing in which said bar is reciprocable, a latchbolt extension unit for extending the effective length of said retractor bar comprising: a retractor bar extension secured at one end to said retractor bar and formed at its other end to engage said retractor, a pair of extension links formed at one of their corresponding ends to connect with said latchbolt housing and at their opposite corresponding ends to connect with said retractor housing, and a cylindrical extension housing extending between said latchbolt housing and said opposite ends of said extension links for holding the latter together as a unit, interengaging elements on said extension links and said retractor bar extension for guiding the latter during reciprocation relative to said links.

6. In combination with a lockset including a retractor and a housing therefor and provided with a retractor bar connected to the latchbolt of the lockset and a cylindrical latchbolt housing in which said bar is reciprocable, a latchbolt extension unit for extending the effective length of said retractor bar comprising: a retractor bar extension connected at one end to said retractor bar for retracting the latter upon inward movement of said extension, an extension link formed at one end for connection to the inner end of said latchbolt housing and at its opposite end for connection to the retractor housing, a cylindrical extension housing secured to said latch bolt housing and extending between said latchbolt housing and said opposite

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end of said extension link for holding said retractor bar extension and said extension link together as a unit.

7. In combination with a lockset including a retractor and a housing therefor and provided with a retractor bar connected to the latchbolt of the lockset and a cylindrical latchbolt housing in which said bar is reciprocable, a latchbolt extension unit for extending the effective length of said retractor bar comprising: a retractor bar extension connected at one end to said retractor bar for retracting the latter upon inward movement of said extension, an extension link formed at one end for connection to the inner end of said latchbolt housing and at its opposite end for connection to the retractor housing, a cylindrical extension housing secured to said latch bolt housing and extending between said latchbolt housing and said opposite end of said extension link for holding said retractor bar extension and said extension link together as a unit, and means for releasably securing said cylindrical extension housing and said extension link by their inherent resiliency.

8. In combination with a latchset including a retractor and a housing therefor and provided with a retractor bar and a cylindrical latchbolt housing in which said bar is reciprocable, a latchbolt extension unit for extending the effective length of said retractor bar comprising: a retractor bar extension secured at one end to said retractor bar and formed at its other end to engage said retractor, a pair of extension links formed at one of their corresponding ends to connect with said latchbolt housing and at their opposite corresponding ends to connect with said retractor housing, a cylindrical housing surrounding said retractor bar extension and said links, said housing being secured at one end to said latch bolt housing and formed at its opposite end to provide a guide for guiding said retractor bar extension.

9. In combination with a latchset including a retractor and a housing therefor and provided with a retractor bar and a cylindrical latchbolt housing in which said bar is reciprocable, a latchbolt extension unit for extending the

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effective length of said retractor bar comprising: a retractor bar extension secured at one end to said retractor bar and formed at its other end to engage said retractor, a pair of extension links formed at one of their corresponding ends to connect with said latchbolt housing and at their opposite corresponding ends to connect with said retractor housing, and guideways in the extension links to guide the retractor bar extension during its longitudinal movement, and means surrounding the extension links, for holding the latter together as a unit.

10. In combination with a latchset including a retractor and a housing therefor and provided with a retractor bar and a cylindrical latchbolt housing in which said bar is reciprocable, a latchbolt extension unit for extending the effective length of said retractor bar comprising: a retractor bar extension secured at one end to said retractor bar and formed at its other end to engage said retractor, a pair of extension links formed at one of their corresponding ends to connect with said latchbolt housing at their opposite corresponding ends to connect with said retractor housing, and a cylindrical extension housing extending between said latchbolt housing and said opposite ends of said extension links for holding the latter together as a unit, an end closure on the housing having a pair of openings formed therein through which the ends of the extension links which connect with the retractor housing extend and also having another opening formed therein through which the one end of the retractor bar which connects with the retractor extends and is guided.

References Cited in the file of this patent

UNITED STATES PATENTS

2,250,036	Schlage	July 22, 1941
2,299,181	Schlage	Oct. 20, 1942
2,719,744	Schlage	Oct. 4, 1955
2,765,187	Crandell	Oct. 2, 1956
2,776,155	Gerlach	Jan. 1, 1957