Jan. 1, 1957 J. R. GERLACH 2,776,155

EXTENSION FOR TUBULAR LATCHES

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FIG. 1.

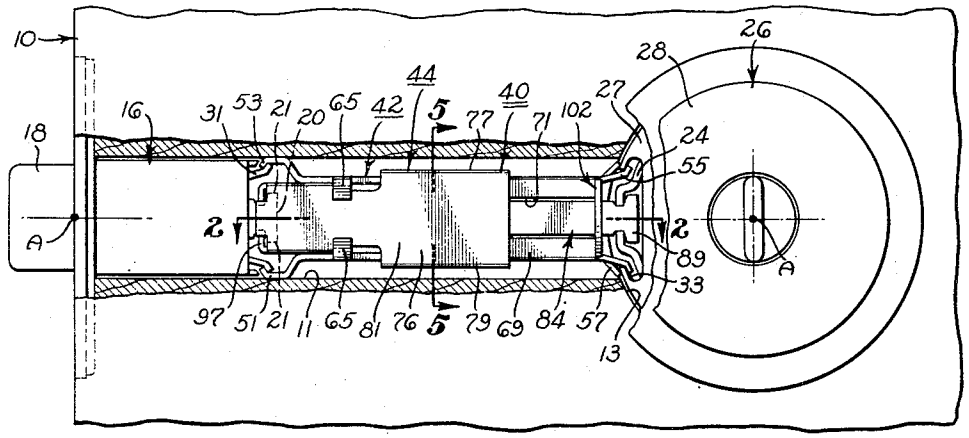


FIG. 2.

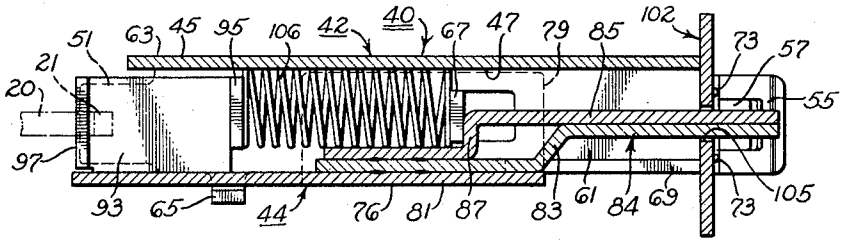


FIG. 3.

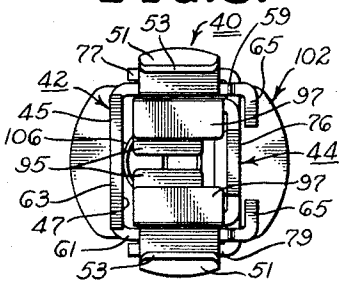


FIG. 4.

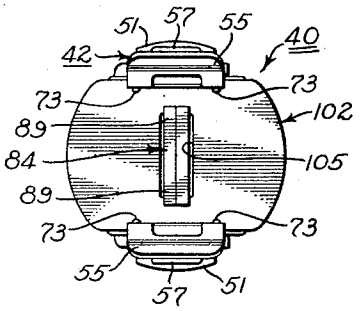
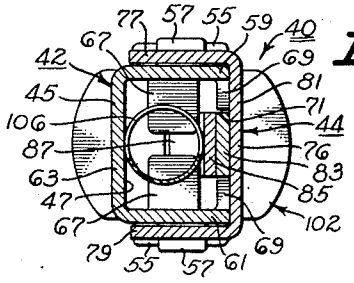


FIG. 5.



INVENTOR.
JOHN R. GERLACH
BY Thomas P. Mahoney
ATTORNEY.

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FIG. 6.

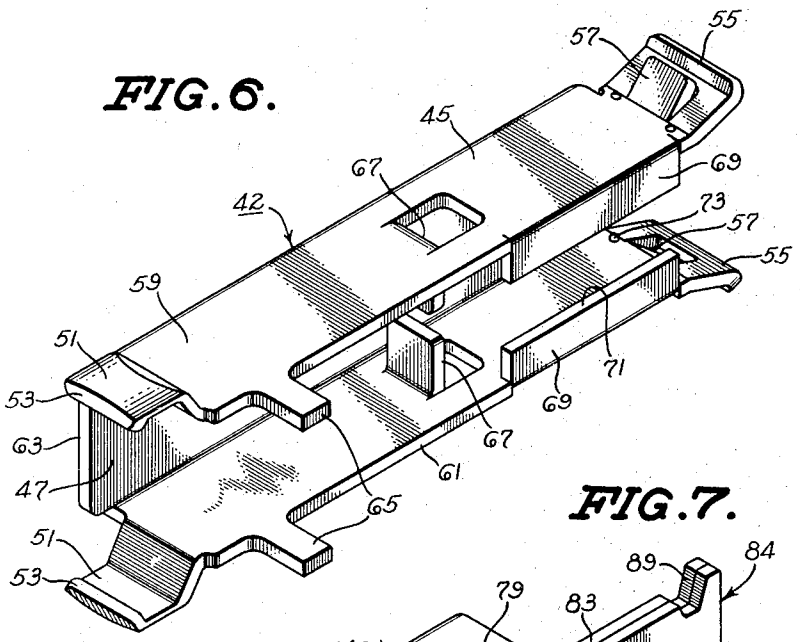


FIG. 7.

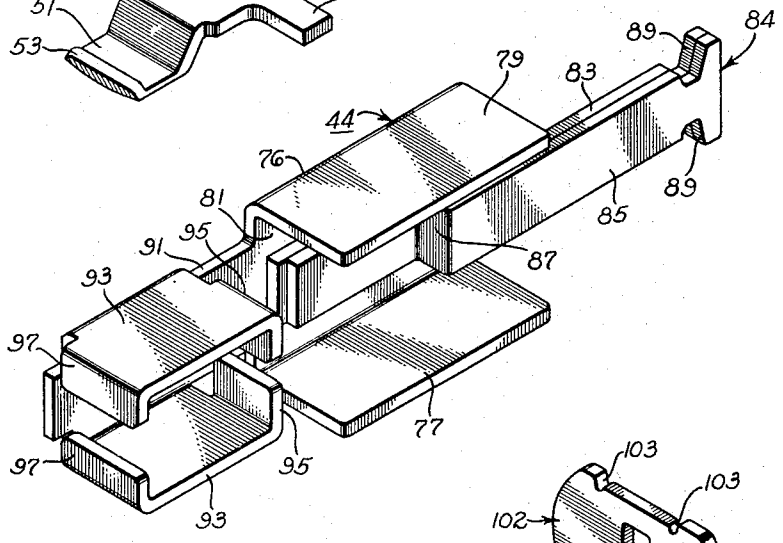
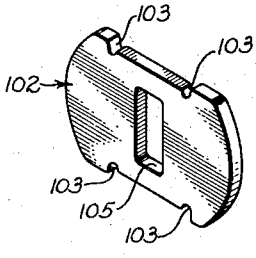


FIG. 8.



INVENTOR.
JOHN R. GERLACH
BY Thomas P. Mahoney
ATTORNEY.

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2,776,155

EXTENSION FOR TUBULAR LATCHES

John R. Gerlach, Los Angeles, Calif., assignor to Kwikset Locks, Inc., Anaheim, Calif., a corporation of California

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5 Claims. (Cl. 292—1)

This invention relates to a latch extension and, more particularly, to an extension which is adapted to be utilized in permitting the actuator for a latch to be set inwardly from the edge of a door a greater distance than is customary. The term "backset" is usually utilized to refer to the distance between the transverse axis of the actuator and the edge of the door and will be so used herein.

In conventional installations, the backset is approximately 2½ to 2¾ inches and the length of the latch casing is such that the sum of its length and the radius of the actuator housing is equal to one of the above measurements or lies therebetween. For many years it has been customary to install locks and latches of the mortise type in the stile of the door with the spindle of the actuator located as close to the edge of the door as possible to reduce the depth of the necessary mortise. To increase the backset of the actuating spindle in such a construction wherein all of the component portions of the lock or latch are embodied in a single housing, would have necessitated the provision of a deeper housing and the forming of an unduly deep mortise in the edge of the door, which is extremely undesirable.

However, in recent years tubular latch and lock sets have been developed wherein the latch bolt and other allied components are assembled in an individual case and wherein the actuator for the latch bolt, including the actuating spindle, are mounted in a separate housing adapted to be installed transversely of the axis of the latch case. Since the two components are separately constructed and can be individually installed in the door with which they are associated, it became practicable to increase the backset of the actuator spindle by mounting the actuator housing a substantial distance inwardly from the edge of the door.

In order to accomplish this desired end and to avoid the necessity for providing separate and specially constructed latch cases to achieve the increased backset, it is desirable to provide to an extension which can be inserted between the end of the latch case and the latch actuator housing and which includes means engageable between the latch and its actuator so that rotation of the actuator spindle will cause concomitant longitudinal movement of the bolt mounted in and projecting from the latch case.

It is, therefore, an object of my invention to provide a latch extension of the aforementioned character which includes an elongated non-movable guide member adapted to be secured at one end to the latch case and at its other end to the housing of the actuator to maintain the latch case and the housing in operative relationship with each other.

Another object of my invention is the provision of an extension of the aforementioned character in which there is provided an elongated connector mounted upon and externally of the aforementioned guide member, said connector being provided at its opposite ends with means engageable, respectively, with the latch bolt extension and the retractor means incorporated in the latch actuator.

The customary mode of mounting tubular latches in the doors with which they are associated is to utilize a jig to facilitate the drilling of an elongated bore in the edge of the door for the reception of the latch case and to drill a transverse, substantially larger bore through the door at a point removed from the edge which will receive the actuator housing and which communicates with the end of the first-mentioned latch case bore. Of course, it is necessary to drill a much deeper bore where it is necessary to increase the backset of the actuator housing and to utilize the extension of my invention. Since the more is much deeper, there is a greater possibility of misalignment of the axis of the latch case bore with reference to the actuator housing bore.

An additional object of my invention is the provision of an extension of the aforementioned character, the greater length of which is of substantially smaller cross-sectional dimension than the diameter of the bore and the latch case with which it is associated to permit the extension to be slightly cocked within the bore and thus accommodate misalignment of the longitudinal axis of said bore with respect to the associated actuator housing bore.

A further object of my invention is the provision of a latch extension of the aforementioned character wherein the guide member is of substantially channel-shaped configuration and wherein the movable connector includes an intermediate channel-shaped portion disposable externally of and slidable upon said guide member. This construction facilitates the assembly of the component parts of the extension and provides a large bearing surface for the movable connector.

Another object of my invention is the provision of an extension of the aforementioned character including spring means for biasing the connector on the guide member in a direction toward the latch case to assist in the ejection of the latch bolt from the latch case when the actuator associated therewith is released and to prevent the extension from imposing an undue frictional drag upon the actuating spring of the latch assembly.

Other objects and advantages of my invention will be apparent from the following specification and the accompanying drawings which are for the purpose of illustration only and in which:

Fig. 1 is a side elevational view showing the extension of my invention in operative position between the latch case and the actuator of a tubular latch set;

Fig. 2 is an enlarged, partly sectional view taken on the broken line 2—2 of Fig. 1;

Fig. 3 is a front elevational view of the extension of my invention;

Fig. 4 is a rear elevational view of the extension;

Fig. 5 is a vertical sectional view taken on the broken line 5—5 of Fig. 1;

Fig. 6 is a perspective view of the elongated guide member incorporated in the exetension;

Fig. 7 is a perspective view of the connector incorporated in the extension; and

Fig. 8 is a perspective view of the end plate insertible in the guide member of the extension.

Referring to the drawings and particularly to Figs. 1–2 and 6–7 thereof, I show a portion of a door 10 in the edge of which has been formed an elongated longitudinal bore 11 which communicates with a transverse bore 13 at its innermost end. Disposed in the outermost end of the elongated, longitudinal bore 11 is a latch case 16, of conventional construction, which provides a receptacle for a latch bolt 18 extending outwardly from the edge of the door 10.

The latch bolt 18 is provided with an extension 20

having upwardly and downwardly extending ears 21 provided thereupon and ordinarily adapted for securement to the retractor 24 of a latch actuator 26 associated with said latch case 16. The latch actuator 26 is incorporated in a housing 27 disposed in the transverse bore 13 and the retractor 24 of said actuator is energizable by the rotation of a knob 28.

In order that the knob 28 of the actuator 26 may be set inwardly a greater distance from the edge of the door than is customary, the backset has been substantially increased. The backset is, as previously defined, the distance between the edge of the door and the transverse axis of the actuator, represented in the present instance by the axis A—A in Fig. 1 of the drawings.

Provided at the innermost end of the latch case 16 are attachment lugs 31 which are ordinarily receivable in the opposite edges of a slot 33 provided in the actuator housing 27. However, since the depth of the longitudinal bore 11 has been greatly increased to provide for the increased backset, it is necessary to provide an extension 40 constructed in accordance with the teachings of my invention and incorporating an elongated guide member 42 which also serves to maintain the latch case 16 and the actuator housing 27 in operative relationship, and an elongated connector 44 which constitutes the mechanical connection between the latch bolt extension 20 and the retractor 24 of the actuator 26.

The elongated guide member 42, as best shown in Figs. 1–2 and 6 of the drawings, is constituted by an elongated channel 45 of substantially U-shaped cross-sectional configuration. The channel 45 defines an elongated recess 47 which is open at both ends and at the side thereof.

Formed integrally with the outermost end of the channel 45 constituting the guide member 42 are fastening means 51 including oppositely oriented lugs 53 engageable by the attachment lugs 31 provided at the innermost end of the case 16, as best shown in Fig. 1 of the drawings. Fastening means 55 are formed integrally with the opposite ends of the channel 45 and have integral upstruck and downstruck locating tabs 57 provided thereupon, the fastening means being engageable in the slot 33 in the actuator housing 27 and the tabs engaging an external, contiguous portion of said housing.

It will be noted that the fastening means 53 and 55 are formed integrally with the top and bottom walls 59 and 61, respectively, of the channel 45 and that these walls are, in turn, formed integrally with a back wall 63.

The lateral edges of the top and bottom walls 59 and 61 are provided, adjacent their forward ends, with oppositely disposed, co-operating retaining lugs 65 and intermediate their ends with co-operating stop lugs 67, for purposes which will be described in greater detail below.

Adjacent their innermost ends, the top and bottom walls 59 and 61 are provided with guide flanges 69 whose opposite edges define an elongated slot 71 therebetween. Retaining detents 73 are provided on the innermost ends of the top and bottom walls 59 and 61, respectively, adjacent the fastening means 55.

The elongated connector 44 of the extension 40 includes an intermediate, substantially U-shaped channel portion 76 defined by a top wall 77, a bottom wall 79, and a back wall 81 formed integrally with said top and bottom walls. Secured to the interior surface of the back wall 81, as best shown in Figs. 2, 5, and 7 of the drawings, is one leg 83 of a rearwardly extending connector portion 84 of the connector 44. The leg 83 is welded, or otherwise fastened, to the back wall 81 and is bent intermediate its ends to space the rearmost portion thereof inwardly from the inner surface of the back wall 81 of the U-shaped channel portion 76 of the connector 44.

A second leg 85 is superimposed upon and fastened to the first leg 83 and is provided with a right-angularly bent stop portion 87 and extends rearwardly from said stop portion to provide, in conjunction with the first leg 83,

upwardly and downwardly extending connector lugs 89 engageable by the retractor 24, as best shown in Fig. 1 of the drawings.

The back wall 81 of the channel portion 76 of the connector 44 is provided with a forward extension 91 having upper and lower, laterally extending portions 93 formed integrally therewith. The portions 93 are provided at their rearmost ends with oppositely disposed, converging lugs 95 and at their forward ends with connector lugs 97. The connector lugs 97 are, as best shown in Fig. 1 of the drawings, engageable with the ears 21 provided upon the latch bolt extension 20.

A retainer and guide plate 102 is provided with oppositely disposed pairs of notches 103 engageable with the contiguous portions of the top and bottom walls 59 and 61, respectively, of the channel 45 at the rearmost end thereof and is retained in operative relationship with said rearmost end by means of the retaining detents 73, as best shown in Figs. 2 and 4 of the drawings. The retainer and guide plate 102 incorporates a centrally located opening 105 for the reception of the elongated connector portion 84 of the connector 44.

A compression spring 106 whose opposite ends are disposed, respectively, between the lugs 95 on the portions 93 of the connector 44 and the stop lugs 67 on the guide 42 serves to bias the connector 44 forwardly in the direction of the latch case 16 and augments the biasing effect of the spring, not shown, incorporated in the latch case to prevent the connector 44 from imposing undue load upon the latch spring.

When the compression spring 106 is inserted in the elongated recess 47 constituted by the walls 59, 61, and 63 with its rear end seated on the lugs 67, the connector 44 can then be assembled in operative relationship with the guide member 42 by dinposing the intermediate channel portion 76 thereof in overlapping relationship with the channel 45 of the guide member 42 intermediate the ends thereof, as best shown in Figs. 1 and 2 of the drawings.

When the intermediate channel portion 76 of the connector 44 is so disposed upon the intermediate portion of the guide member 42, the portions 93 extend laterally into the recess 47 at the forward end thereof and the connector portion 84 of the connector 44, as constituted by the elongated legs 83 and 85, extends through the slot 71 defined by the oppositely oriented flanges 69 into the rear portion of the recess 47.

After this initial assembly operation has been completed, the retaining lugs 65 secure the guide member 42 and the connector 44 in operative relationship with each other. It should be clear that the provision of an elongated channel-shaped guide member 42 and a connector member 44 which is disposable in telescoping relationship therewith materially simplifies the assembly of the component portions of the extension 40 and thus reduce the time and labor which would ordinarily be expended in the assembly of a more complex extension. Furthermore, the overlapping of the channel portion 76 with the intermediate channel 45 constituting the guide member 42 provides a central bearing surface for the connector 44 and prevents the binding of the forward or rear ends of the connector upon contiguous areas of the guide member 42.

Thus, a relatively large bearing surface is provided and the possibility of cocking of the connector 44 axially with respect to the channel 45 is obviated.

Since the spring 106 biases the connector 44 outwardly from the forward end of the channel 45, it is necessary to prevent ejection of the connector 44 from its operative relationship with the guide 42 and this is accomplished by the provision of the stop portion 87 on the second leg 85 of the connector portion 84 of the connector 44 which engages the stop lugs 67 provided on the top and bottom walls 59 and 61 of the channel 45. Of course,

the stop lugs **67** also serve as a seat for the inner end of the compression spring **106**.

After the assembly of the connector **44** upon the guide member **42** has been accomplished, the retainer plate **102** can be fitted over the rearwardly extending connector portion **84** of the connector **44** and be snapped into place by engagement of the notches **103** with the adjacent portions of the top and bottom walls **59** and **61** and engagement with the retaining detents **73** of said walls.

It should also be noted that the arcuate edges of the plate **102** are engageable with contiguous portions of the bore **11** in which the extension **40** is located to prevent substantial misloction of the inner tnd of the extension **40** with respect to said bore.

When it is desired to install an extension of my invention in conjunction with a conventional tubular latch or lock set, it is merely necessary to engage the fastening means **51** on the forward end of the elongated guide member **42** upon the attachment lugs **31** provided at the rear end of the latch case **16**, and to insert the extension **40** and the latch case **16** as a unit in the bore **11**. The actuator housing **27** is then inserted in conventional fashion in the transverse bore **13** and the fastening means **55** and locating tabs **57** operatively connected to said housing.

Of course, simultaneously with the attachment of the latch case **16** to the forward end of the guide member **42**, the latch bolt extension **20** is interengaged with the connector lugs **97** provided on the forward ends of the portions **93** and the connector **44** and the connector lugs **89** on the rearwardly extending connector portion **84** of the connector **44** are similarly engaged with the retractor **24** of the latch actuator **26**.

It is readily apparent, therefore, that I provide by my invention a backset extension constituted by a minimal number of easily assembled parts which can be easily installed between the latch case and its associated actuator housing. Also characteristic of the backset extension of my invention is the provision of mating channel-shaped guide and connector members, the connector member being provided with a centrally located channel-shaped portion engageable upon the intermediate portion of the channel constituting the guide member to provide a large external bearing area without the necessity for the installation of the connector internally of the guide member and eliminating the possibility that the connector may bind at either end upon the guide member.

I claim as my invention:

1. In an extension for a latch insertible between said latch and the actuator therefor, said latch having a bolt extension and said actuator incorporatig a retractor, the combination of: a non-movable guide member having an elongated opening in a side thereof and secured at its opposite ends to said latch and said actuator; and a movable connector member disposed in overlying and slidable relationship with said guide member, said connector member having front and rear connector portions thereupon and extending through said opening into the interior of said guide member for securing said bolt extension and said retractor in operative relationship with each other.

2. In an extension for a latch insertible between said latch and the actuator therefor, said latch having a bolt extension and said actuator incorporating a retractor, the combination of: a non-movable guide member having an elongated opening in a side thereof and secured at its opposite ends to said latch and said actuator; a movable connector member disposed in overlying and slidable relationship with said guide member, said connector member having front and rear connector portions thereupon and extending through said opening into the interior of said guide member for securing said bolt extension and said retractor in operative relationship with each other; and spring means interposed between said guide and connector members for biasing said connector member toward the latch end of said guide member.

3. In a backset extension for a latch, the combination of: an elongated inner channel member having a longitudinal opening in a side thereof and having securement means at its opposite extremities and stop means intermediate said extremities; an outer channel member disposed in overlying relationship with an intermediate portion of said inner channel member and having securement means on its opposite ends extending through said opening into the interior of said inner channel member and having an abutment extending into said interior; and spring means disposed between said stop and said abutment for urging said outer channel member toward the latch end of said inner channel member.

4. In a backset extension for a latch, the combination of: a first, channel-shaped guide member having securement means on its opposite ends; a connector having a U-shaped intermediate portion embracing said guide member intermediate its ends and provided with laterally extending securement portions movable in the interior of said guide member; and spring means engageable between said guide member and one of the extremities of said connector for biasing said connector toward the latch end of said guide member.

5. In an extension for a latch adapted to be interposed between said latch and its actuating mechanism, said latch having a case and a bolt extension extending from the innermost end of said case and said mechanism including a housing and a retractor movable in said housing, the combination of: a first channel member, said member having engagement means at its opposite ends for securement, respectively, to said case and said housing to maintain said case and said housing in operative relationship with each other; and a second channel member movable on said first channel member and having connectors on its opposite ends for engagement, respectively, with said extension and said retractor.

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