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Fig. 2

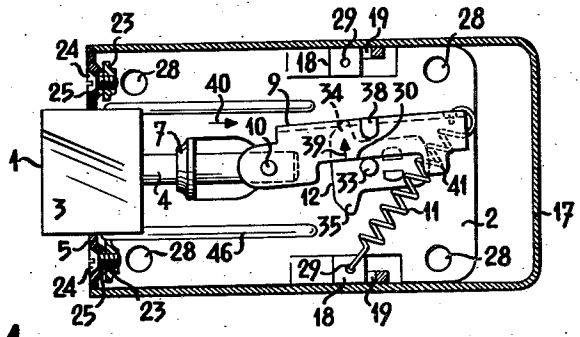


Fig. 1

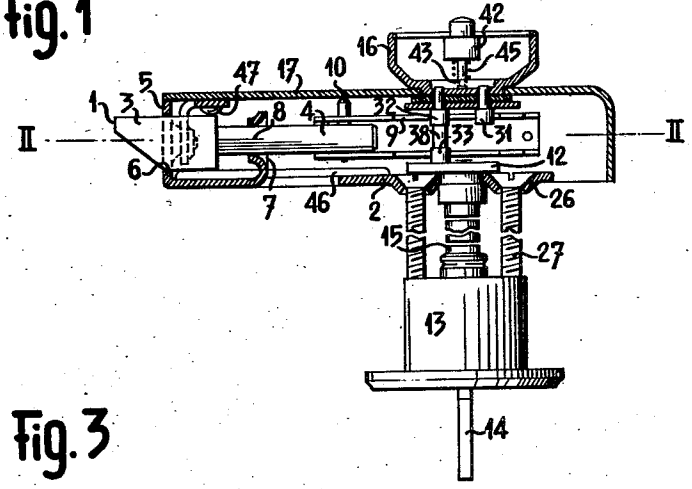
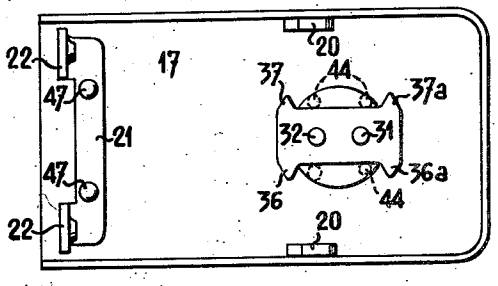


Fig. 3



INVENTORS

Marcel Fresard
Max Huber.

BY Emery L. Wolff

ATTORNEY

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IMPROVEMENTS IN AND RELATING TO LOCKS

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Fig. 5

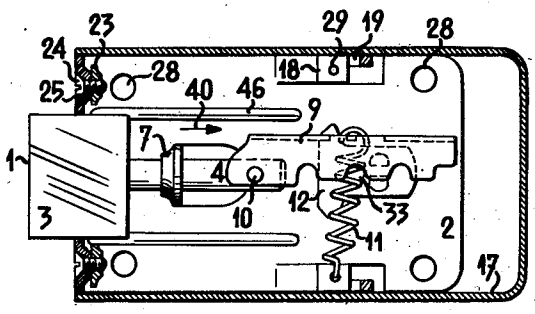


Fig. 4

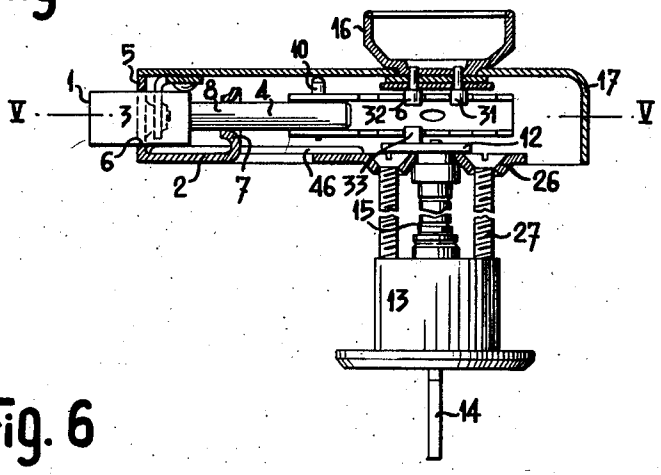
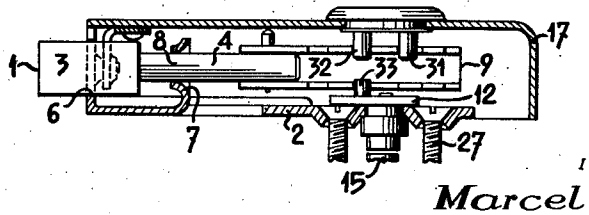


Fig. 6



INVENTORS

Marcel Fresard

Max Huber.

BY Ernest L. Groff

ATTORNEY

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Fig. 7

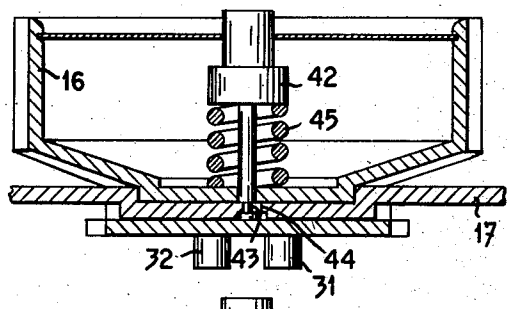


Fig. 8

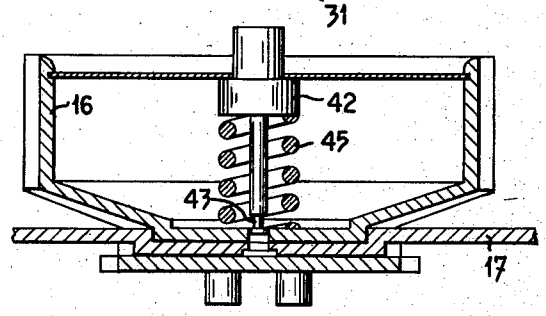
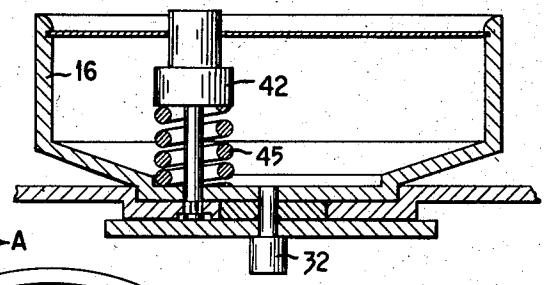


Fig. 9



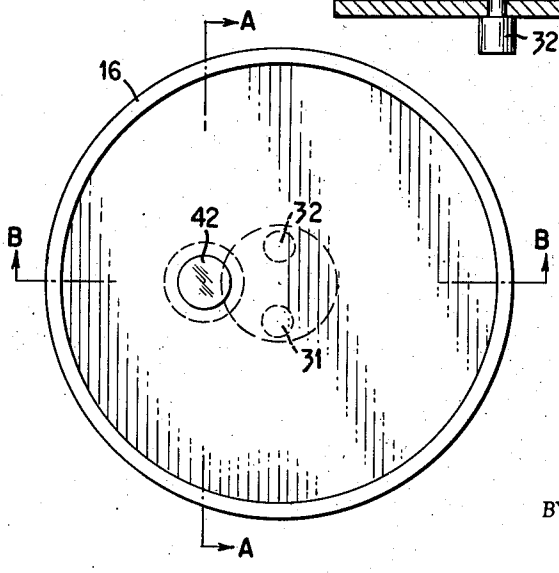


Fig. 10

INVENTORS

Marcel Fresard

Max Huber.

BY

ATTORNEY

United States Patent Office 2,797,570 Patented July 2, 1957

2,797,570

IMPROVEMENTS IN AND RELATING TO LOCKS

Marcel Fresard and Max Huber, Geneva, Switzerland, assignors to Mefina S. A., Fribourg, Switzerland, a Swiss company

Application May 14, 1953, Serial No. 354,997

Claims priority, application Switzerland May 20, 1952

2 Claims. (Cl. 70—129)

The present invention has for its subject a bolt of the type permitting closure with a double turn and comprising a catch bolt to which is hinged an actuating rod capable of being moved by a catch actuated by a cylinder device, controlled by a key, a casing enclosing all the mechanism of the bolt.

Heretofore, some spring-latch locks have been constructed in such a manner that the bolt operating mechanism is mounted in a casing having a bottom plate, and the same mechanism is positioned on the inner surface of said bottom plate. In other types of spring-latch locks the component elements of said mechanism are maintained in position on such bottom plate. In the former type of lock, the lock must be separated from the door before its component elements can be cleaned or oiled; in the latter type of lock, the casing can be removed to reach the bolt operating mechanism for cleaning and lubricating without separating the base or bottom plate carrying said mechanism from the door, but here the least jarring will cause said mechanism component elements to separate from each other.

The lock of this invention is so constructed that its casing can be removed therefrom without removing the entire lock from the door to which it is attached and that, after removal of said casing, the bolt operating mechanism elements will not be separated from each other upon jarring same inadvertently. With my lock, the bolt is capable of operation smoothly and effectively even after the removal of its casing therefrom, and the lock comprises a base plate for carrying the bolt operating mechanism, said base plate being of such construction that a portion thereof acts as a stop means for the catch bolt in its forward and retracted position.

An object of this invention is to provide a spring-latch bolt lock having a casing easily removable therefrom while the lock is attached to the door and a bolt operating mechanism attached to a bottom plate, said mechanism and plate being capable of operating effectively even if inadvertently jarred.

Another object of this invention is to provide a spring-latch bolt lock which remains effective in its operation after the removal of its casing therefrom.

A further object of this invention is to provide a spring-latch bolt comprising a bolt locking button or member which is positioned in bolt knob and is operatively associated therewith.

A further object of my invention is to provide a spring-latch bolt having a casing which can be mounted over the bolt operating mechanism after the latter has been mounted on a door.

Other objects and features of my invention will become apparent from the following detailed description.

Fig. 1 is a cross-section through the mechanism according to a first form of construction of the bolt.

Fig. 2 is a sectional view of the said mechanism, the casing being in section along the line II—II of Fig. 1.

Fig. 3 is a view showing the interior of the casing.

Fig. 4 is a cross-section of the second form of construction of the bolt, and

Fig. 5 is a sectional view of its mechanism, the casing being in section on the line V—V of Fig. 4.

Fig. 6 is a partial view in section of a modification of the second form of construction.

Figure 7 is a view in cross-section on line A—A of Figure 10, showing the elements in one position.

Figure 8 is also a view in cross-section on line A—A of Figure 10, showing the elements in another position.

Figure 9 is a view in cross-section on line B—B of Figure 10.

Figure 10 is a plan view of the operating knob.

The two forms of construction of the bolt shown comprise a catch bolt **1** mounted slidably on a base plate **2**. As shown in the drawing, the catch bolt **1** is formed in two parts. One part **3**, of general parallelepiped shape, is adapted to co-operate with the staple (not shown) and the other **4**, of elongated shape, is of smaller cross-sectional area than the first. In the forms of construction shown, said part **4** is of circular cylindrical shape.

The base plate **2** has a rim **5** provided with an opening **6** of a shape corresponding with that of the cross-section of the part **3**. The latter is therefore adapted to slide in the opening **6** serving to guide the same. A second axial guide member for the catch bolt is provided on the base plate **2**. In fact, an edge **7** is cut and bent back on the base plate **2**. The edge **7** has a bore **8** in which is guided the part **4** of the catch bolt. It is to be observed that the edge **7** not only serves as a guiding element, but also forms a stop for the catch bolt **1** in the retracted position.

An operating rod **9** is hinged to the free end of the elongated part **4** forming a rod of the catch bolt **1**. This rod is in the form of a channel. The free end of the rod **4** engages with the said channel. The rod **4** and the rod **9** are connected together by a pin **10**.

The rod **9**, which is subjected to the action of a spring **11**, hooked to the base plate **2**, is capable of being moved by a catch **12** turning in the base plate **2** and adapted to be actuated by a cylinder device **13** actuated by a key **14** through the medium of a driving member **15**.

The rod **9** may also be actuated by means of an operating knob **16** turning in the bolt casing **17**.

A hooking member **18** is formed on each of the lateral sides of the plate **2**. Said hooking members **18** are adapted to co-operate with the corresponding parts **19** of the casing **17**. Said parts **19** are formed on two plates **20** welded to the interior of the casing **17**.

A part **21** is welded transversely in the casing **17**. Said part **21** has two portions **22** folded at right angles and pierced with a screw-threaded hole **23**. The holes **23** are provided so as to enable the casing **17** to be secured by screws **24** to the base plate **2**. In fact, said screws **24** pass through the holes **25** drilled in the rim **5** and serve to press this against the parts **22**.

The base plate **2** also has two holes **26** provided for the passage of screws **27** for securing the cylinder device in the door.

The base plate **2** thus replaces the plate used usually for mounting the cylinder device on a door. Holes **28** are also provided for the passage of screws for securing the bolt to the door.

It is to be observed that a hole **29** is provided in each of the hooking members **18** so as to enable the spring **11** to be secured thereto.

Thus, when the bolt is to be mounted in the symmetrical position shown in the drawing and that it is desired for the operating knob **16** to be operated in the most favorable position, it is sufficient to withdraw the pin **10** from the catch bolt, to reverse the rod **9** relatively thereto and to replace the pin **10**. The spring **11** is then hooked to the opposite hole **29**.

In the first form of construction of the bolt shown in Figs. 1 to 3, the catch bolt is bevelled so as to permit the automatic closure of the door no which the bolt is mounted without it being necessary to utilize either the key **14** or the operating knob **16**.

In the normal position of the catch bolt, the rod **9** is held by the spring **11** in contact at its edge **30** with two fingers **31** and **32** secured to the operating knob **16**. The two fingers **31** and **32** are diametrically opposed relatively to the axis of rotation of the knob **18** and project into the casing **17**.

The edge **30** of the rod **9** is smooth over a predetermined length so as to enable the rod **9** to slide against the fingers **31** and **32** in the normal position of the bolt so as to allow the catch bolt to telescope into the interior of the casing when closing the door.

The catch has a finger **33** and also two pins **34** and **35** and the operating knob has four pins **36**, **37**, **36***a*, **37***a*.

The pin **34** of the catch and the pin **36** of the knob are adapted to co-operate independently of one another with a stop **38** provided on the rod **9** so as to withdraw the catch into the casing **17** against the action of the spring **11**, for the purpose of opening the door, The stop **38** is formed, in this form of construction, by a pin secured transversely in the rod **9** and projecting to opposite sides of this.

Fig. 2 makes it possible to see clearly the method of operation of retraction of the catch **1** into the casing **17**. In fact, it suffices, as will be seen in this figure, to turn the catch **12** about a quarter of a revolution in the direction of the arrow **39** so as to cause the pin **34** to move, through the pin **38**, the rod **9** and the catch bolt **1** in a movement of translation in the direction of the arrow **40**. An identical movement of translation may be produced by turning the knob **16** through about a quarter of a revolution, by reason of the pin **36** then co-operating with the other end of the pin **38**.

The normal position of the catch bolt **1** is determined by a projection **41** provided on the rod **9**. The normal position of rest of the catch bolt **1** is in fact determined by the coming into contact of said projection **41** with the finger **31** which is the finger of the knob **16** farthest removed from the catch bolt **1**.

The driving in rotation, either of the catch **12**, or of the knob **16** in the direction of closing, that is to say in a direction opposite to that indicated by the arrow **39**, from the normal position shown in Fig. 2, produces the disengagement of the projection **41** of the finger **31** which serves as a stop for the latter. When this disengagement has taken place, the spring **11**, by acting on the rod **9**, maintains this in contact with the finger **33** of the catch, thus producing a movement of oscillation and of translation of the rod, pushing the catch bolt **1** to the outside of the casing. When the finger **33** resumes the position shown in Fig. 2, the projection **41** engages between the fingers **31** and **32** of the knob **16**. The catch bolt **1** has thus been moved outwardly a distance equal to that separating the centres of the two fingers **31** and **32** and its closing position is determined by the engagement of the projection **41** between the pins **31** and **32**, said engagement preventing the catch bolt **1** from being pushed into the interior of the casing **17** by acting directly thereon in the direction of the arrow **40**.

On the other hand, in this first form of construction, the operating knob is provided with a locking member adapted to co-operate with the casing so as to enable the catch bolt to be locked in the retracted position.

The locking member is formed by a plunger piston **42** sliding in the knob **16** and of which the inner end has a groove **43**. The end of the piston provided with the groove **43** is capable of being engaged in one of four holes **44** in the casing against the action of a spring **45** when the operating knob is in the position producing the retraction of the catch bolt **1** into the interior of the casing, as is clearly shown in Figures 7–10, inclusive.

As in this position, the spring **11** tends to return the catch bolt into its normal position, the action of the spring **11** causes the piston **42** to remain engaged by reason of its groove **43** in the corresponding hole **44**. It suffices for releasing the knob **16** to cause it to turn in the opening direction so that the piston **42** resumes its normal position under the action of its spring **45**.

It is to be observed that ribs **46** are formed in the base plate **2** so as to form sliding tracks for the catch bolt **1**, while at the same time forming rigidity ribs on the base plate **2**. Further, bosses **47** are provided on the said part **21** for guiding the catch bolt **1** when this is positioned, relatively to the casing, in a reverse position to that shown in Fig. 1.

The second form of construction of the bolt shown in Figs. 4 and 5 is similar to the first form of construction In fact, it is composed of the same parts, except as regards the part **3** of the catch bolt **1** and the control **9** thereof.

The catch bolt **1** is no longer bevelled, but is of classical parallelepiped shape.

The rod **9** is always in the form of a channel but the edges thereof are cut in the form of teeth, in such a manner as to form a rack. Further, as the spring **11** must only act transversely on the rod **9** for maintaining this in contact with the two fingers **31** and **32** of the knob **16**, said spring is no longer hooked to the free end of the rod, but to the middle part thereof. Further, the pin **38** is omitted.

The operation of the second bolt is as follows:

Normally, the fingers **31** and **32** of the operating knob **16** and the finger **33** of the catch **12** engage with notches of the rod or rack **9**. Each rotation through a revolution of the catch **12** produces a movement of oscillation of the rack as also a translation thereof which is transmitted to the catch bolt **1** by means of the pin **10**.

It is to be observed that for one turn of rotation of the catch **12** only a half of this turn produces a movement of the catch bolt **1**.

On the contrary, when operating the bolt by means of the knob **16**, a half a turn thereof is sufficient to move the catch through a distance corresponding to one turn of the key.

In this second form of construction, the locking device **42**, **44**, **45**, is no longer necessary, in view of the fact that the catch is held in a stable manner in its three positions, that is to say the retracted position in the interior of the casing **17**, the closing position by one turn of the key, which is that shown in Fig. 5, and the closing position by two turns of the key.

The third form of construction shown in Fig. 6 is only a modification of the second. In fact, this third form of construction has the same elements as that of the second, only the operating knob **16** is omitted. In this case, the two fingers **31** and **32** are secured relatively to the casing **17**.

The bolt can therefore only be actuated by the key and its operation is identical with that of the second form of construction.

As above described, the mounting of a lock provided with a bolt such as those above described, is more rapid than the mounting of a lock of the same type of known construction. In fact, as the cylinder device can be secured, for example on a door, by using directly the base plate **2** of the bolt housing instead and in place of the plate generally used, once the cylinder device has been fixed it is sufficient to adjust the casing **17** on the base plate so that the mounting of the complete lock is effected.

Various modifications in construction may be applied to the bolts described.

The axial guide elements **5** and **7** of the catch bolt **1**, instead of being cast as a unit with the base plate **2**, may be made separate therefrom.

The cross-section of the elongated part **4**, instead of

being round, may be of any other shape, for example polygonal.

In a further modification, the spring **11**, which is of the coiled type, is replaced by a spring of a different type.

We claim:

1. A lock adapted to be mounted against a door surface and to permit closure with a double turn of a key, comprising, in combination, a base plate including a rim at one end thereof, said rim having an opening therethrough, said base plate having a bent portion having a bore therethrough, said bore being positioned opposite to said opening through said rim, a catch bolt having a substantially parallelepiped shaped portion and an elongated portion, said former portion being slidably positioned in said rim at the said opening and the latter portion being slidably positioned in said bent portion at the said bore, said latter portion being smaller in cross-sectional area than said former portion, said former portion being greater in cross-sectional area than said bore, whereby said bent portion having said bore can act as a stop for said former portion, track means on said base plate for guiding said catch bolt, a channel-shaped connecting member operatively connected to said elongated portion of said catch bolt, means mounted on said base plate and in contact with said connecting member for moving said connecting member, said means including a catch member, a spring means for holding said connecting member in contact with said catch member, said spring means being operatively connected to said connecting member and to said base plate, a bolt casing secured to said base plate, said casing being positioned about said substantially parallelepiped shaped portion and the said elongated portion of the catch bolt, said bent portion of said base plate, said track means, said connecting member, said catch member, and said spring means, a rotatably mounted operating knob mounted on said casing, at least two finger members secured to said knob, said fingers being diametrically opposed relative to the axis of rotation of said knob and projecting into the said casing and slidably contacting said connecting member, whereby the catch bolt can telescope into the interior of the casing when the door is closed, a driving member operatively connected to said catch member, said driving member being mounted on said base plate, and a locking device operatively connected to said driving member, whereby said locking device can actuate said connecting member and thus said catch bolt through the medium of said driving member which actuates said catch member.

2. A lock adapted to be mounted against a door surface, comprising, in combination, a base plate including a rim at one end thereof, said rim having an opening therethrough, said base plate having a bent portion having a bore therethrough, said bore being positioned opposite to said opening through said rim, a catch bolt having a substantially parallelepiped shaped portion and an elongated portion, said former portion being slidably positioned in said rim at the said opening and the latter portion being slidably positioned in said bent portion at the said bore, said latter portion being smaller in cross-sectional area than said former portion, said former portion being greater in cross-sectional area than said bore, whereby said bent portion having said bore therethrough can act as a stop for said former portion, a connecting member operatively connected to said elongated portion of said catch bolt, means mounted on said base plate and in contact with said connecting member for moving said connecting member, said means including a catch member, a spring means for holding said connecting member in contact with said catch member, said spring means being operatively connected to said connecting member and to said base plate, a driving member operatively connected to said catch member, said driving member being mounted on said base plate, and a locking device operatively connected to said driving member, whereby said locking device can actuate said connecting member and thus said catch bolt through the medium of said driving member which actuates said catch member.

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