March 17, 1959 T. B. LINTON 2,878,049

LATCH CONSTRUCTION

Filed Oct. 22, 1956

FIG. 1.

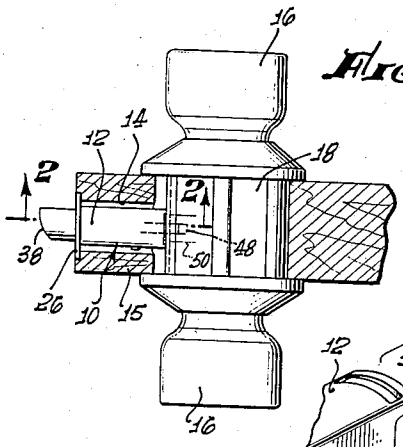


FIG. 6.

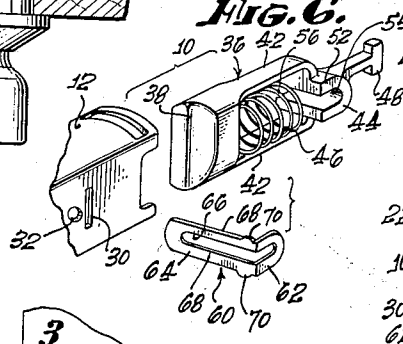


FIG. 3.

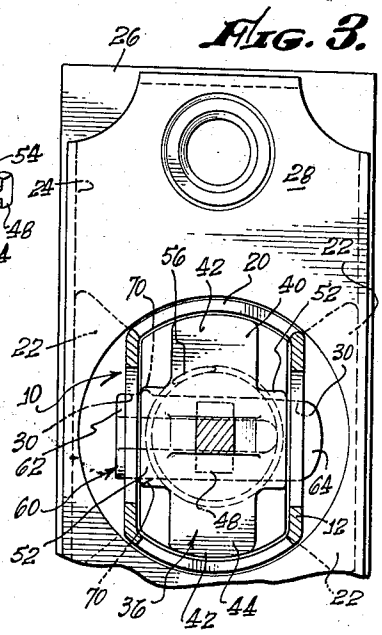


FIG. 2.

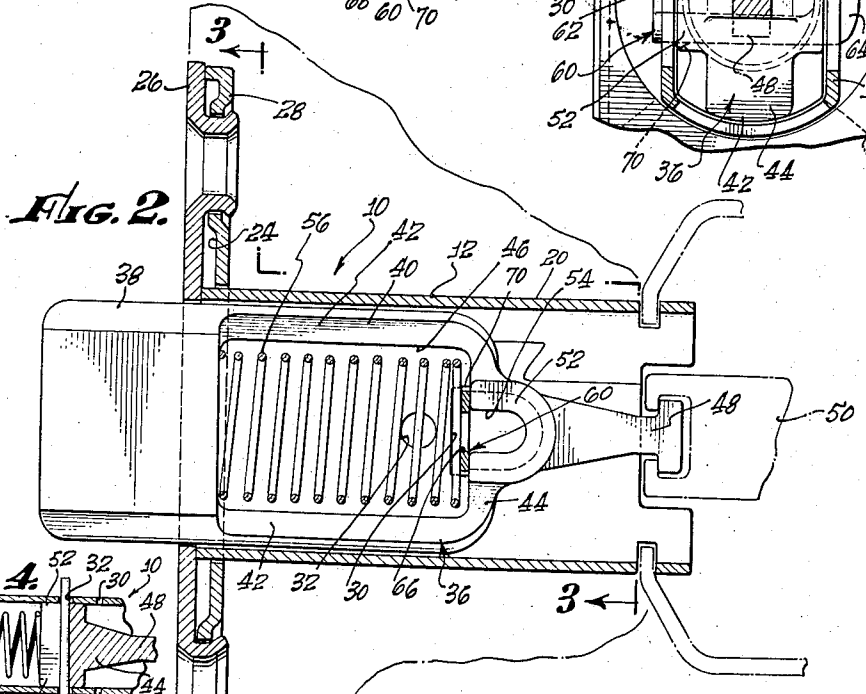
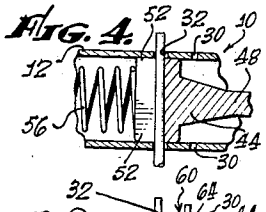


FIG. 4.



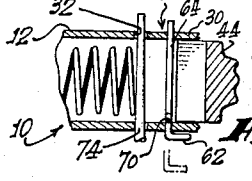


FIG. 5.

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2,878,049

LATCH CONSTRUCTION

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Application October 22, 1956, Serial No. 617,509

4 Claims. (Cl. 292—1)

This invention relates to a latch construction adapted to be inserted in a tubular bore in an edge of the door with which it is associated.

Latch constructions of the general character of that under consideration here are high production items and improvements in such latch constructions which reduce the assembly or manufacturing costs thereof result in substantial savings to the manufacturer and to the purchasing public even when the cost reduction per individual latch is relatively small.

It is, therefor, an object of my invention to provide a latch which is characterized by its simplicity of construction and the ease with which the component parts thereof may be assembled into an operative mechanism.

Another object of my invention is the provision of a latch which includes an elongated, substantially tubular housing open at both extremities, the housing being adapted for the reception, as a unit, of a bolt member and a spring for projecting said bolt member from the housing. By inserting the bolt member and the bolt projecting spring as a unit, substantial savings in assembly time are achieved, thus reducing the total cost of the latch of my invention.

An additional object of my invention is the provision of a latch of the aforementioned character wherein the bolt member and spring, when once installed in the housing of the latch, are retained in operative relationship therewith by means of a retainer which is insertible through retainer receiving openings in the wall of the housing and which serves both as a seat for the bolt projecting spring and as means for retaining the bolt in operative relationship with the housing therefor.

The bolt member or structure incorporated in the latch of my invention includes a bolt nose and an elongated, rearwardly extending bolt extension and there is provided in the extension an elongated opening for the reception of the bolt projecting spring into which the bolt projecting spring can be inserted prior to the installation of the bolt member and said spring in the housing of the latch. However, once the spring and bolt member are inserted as a unit in the housing, the installation of the retainer which serves as a seat for the spring and retaining means for the bolt constitutes a considerable problem and I have provided, in the latch of my invention, a bolt member, the extension of which incorporates an installation tool receiving recess.

Also incorporated in the housing are tool receiving openings through which an installation tool can be received prior to installation of the retainer in operative relationship with the housing.

When the installation tool is inserted through the installation receiving opening in the housing it can be extended through the tool receiving recess in the bolt extension behind the inner extremity of the spring. The nose of the bolt can then be depressed inwardly into the housing causing the bolt extension to move rearwardly while the inner extremity of the spring is held against movement by the installation tool. Thus, the retainer can be readily inserted through the retainer receiving opening in the wall of the housing and, when so inserted, lies behind the inner extremity of the spring to serve as a seat therefor while its opposite surface is engaged by the bolt extension to prevent the withdrawal of the bolt from the housing or the complete projection thereof beyond the housing by the action of the associated bolt projecting spring.

Another object of my invention is the provision, in a latch of the aforementioned character, of a retainer which is easily inserted in operative relationship with the housing and with the bolt member and bolt projecting spring incorporated therein and which includes means engageable with the housing to maintain it in operative relationship therewith until the need for dismounting of the bolt member or the spring associated therewith arises.

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

Fig. 1 is a transverse, sectional view showing the latch of my invention mounted in the edge of an associated door;

Fig. 2 is a longitudinal, sectional view taken on the broken line 2—2 of Fig. 1;

Fig. 3 is a vertical, sectional view taken on the broken line 3—3 of Fig. 2;

Fig. 4 is a transverse, sectional view showing the insertion of the installation tool through the housing;

Fig. 5 is a view similar to Fig. 4 showing the installation of the retainer in operative relationship with the housing; and

Fig. 6 is an exploded view showing the various components of the latch of my invention.

Referring to the drawing and particularly to Figs. 1–2 thereof, I show a latch **10** constructed in accordance with the teachings of my invention, said latch including an elongated, substantially tubular housing **12** formed from sheet metal, or the like, and installed in an axial bore **14** in the edge of a door **15** with which the latch **10** is associated.

Operatively associated with the latch **10**, in a conventional manner, are inner and outer actuator knobs **16** which are mounted for rotation in an actuator housing **18** to cause an actuator, not shown, energizable thereby to co-operate with the latch **10** in a conventional manner.

The latch **10** includes an elongated, tubular body **20** formed from sheet metal and open at its opposite extremities. The elongated, tubular body **20** is provided at its outer extremity with right-angularly directed mounting tabs **22**, as best shown in Fig. 3 of the drawing, said tabs being maintained and disposed in a space **24** defined between a face plate **26** and a backing plate **28** operatively secured thereto. Oppositely disposed slots **30** are, as best shown in Figs. 3–6 of the drawing, formed in the wall of the tubular body **20** and oppositely disposed tool receiving openings **32** are formed in said body in contiguity to the retainer receiving slots **30**.

Disposable in operative relationship with the housing **12** and, more particularly, with the tubular body **20** thereof, is an elongated bolt member **36** which may be formed from powdered metal or cast from brass as an integral unit and which includes a bolt nose **38** of conventional configuration and an inwardly oriented bolt extension **40**.

The bolt extension **40** is, in the present embodiment of my invention, cast integrally with the bolt nose **38** and thus the bolt member **36** is formed in a single unit. The bolt extension **40** is, as best shown in side elevation in Fig. 2 of the drawing, substantially U-shaped in configuration and includes spaced legs **42** terminating in a bight **44** which, in conjunction, define a bolt spring receiving opening **46**. Formed integrally with the bight **44** and projecting rearwardly therefrom is an elongated bar **48**, the

innermost extremity of which is engageable by a retractor 50 incorporated in the actuator housing 18.

On opposite sides of the bight are provided integral, laterally extending projections 52 which, as best seen in Figs. 3 and 4 of the drawing, engage contiguous areas of the inner surface of the wall of the tubular body 20 of the housing 12, thus serving as guides for the bolt member 36 during the retraction and extension thereof, in a manner to be described in greater detail below.

Formed in the bight 44 of the bolt member 36 and, more particularly, in the bolt extension 40 thereof, is a tool receiving recess 54 which, as best shown in Figs. 2 and 6 of the drawing, is in communication with the bolt spring receiving opening 46 defined by the bolt extension 40. Disposable in the spring receiving opening 46 is a bolt projection compression spring 56 which, as best shown in Fig. 6 of the drawing, can be located in the spring receiving opening 46 in the bolt member 36 prior to the installation thereof in operative relationship with the tubular body 20 of the housing 12.

Prior installation of the bolt projecting spring 56 in operative relationship with the bolt member 36 in this manner eliminates the necessity for separate installation of the spring and bolt member and thus greatly reduces the assembly time involved in the assembly of the component portions of the latch, materially reducing the total assembly cost and resulting in substantial savings in this high production art.

The assembled bolt 36 with the compression spring 56 disposed in the spring receiving opening 46 therein can be inserted into the tubular body 20 from either end thereof, but since there is no seat for the spring 56 the structure as thus far assembled is inoperative. In order to provide a seat for the inner extremity of the spring 56 and means for retaining the bolt member 36 against complete projection from the tubular body 20 of the housing 12 by the action of the spring 56, I provide a retainer 60, said retainer, as best shown in Figs. 3 and 6 of the drawing, being formed from sheet metal, or the like, and having a right-angularly bent head 62 formed integrally with an elongated body 64.

A continuous slot 66 is provided in the body 64 and head 62 to define parallel legs 68 which incorporate at the extremities thereof adjacent the head 62 protuberances 70 engageable, as best shown in Figs. 3 and 5 of the drawing, with the inner surface of the wall of the tubular body 20 to retain the retainer 60 in operative relationship with said tubular body after it has been installed therein.

The retainer 60 is of the snap-in type, in other words, when inserted through the openings 30 the legs 68 thereof are urged inwardly toward each other and snap outwardly after the protuberances 70 engage the inner wall of the body 20. Conversely, when the retainer 60 is removed from operative relationship with the openings 30, the legs 68 are biasted inwardly toward each other to permit the retainer to be freed from operative relationship with the body 20.

In order to properly install the retainer 60 in operative relationship with the tubular body 20 of the housing 12, it is necessary to insert an elongated installation tool 74 through the installation openings 32. During the initial insertion of the installation tool 74, it will pass into the tool receiving recess 54 behind the inner extremity of the bolt projection compression spring 56, thus by-passing the inner extremity of said spring. When completely inserted through the tool receiving opening 32, the tool 74 assumes the relationship with the tool receiving recess 54, best shown in Fig. 4 of the drawing.

Subsequently, the bolt nose 38 of the bolt member 36 is depressed inwardly to cause the inner extremity of the spring 56 to engage the installation tool 74 while retaining said inner extremity of said spring during continued inward movement of the bolt member 36 as caused by continued depression of the bolt nose 38. When the bight 44 of the bolt extension 40 clears the retainer receiving openings or slots 30 in the tubular body 20, and assumes the position shown in Fig. 5 of the drawing, the retainer 60 can be inserted through the openings or slots 30. As the body 64 and, more particularly, the outer extremity of said body, reaches the opening 30 intended for the reception of the same, the protuberances 70 on the oppositely disposed legs 68 of said body are depressed during their passage through the oppositely disposed openings 30 and then snap outwardly because of the inherent resilience of the legs 68 into engagement with the inner surface of the wall of the tubular body 20 of the housing 12, thus maintaining the retainer 60 in operative relationship with said tubular body.

After the installation of the retainer 60 in the above described manner, the tool 74 can be withdrawn from the tool installation openings 32 and the inner extremity of the compression spring will move inwardly to seat upon the transversely oriented body 64 of the retainer 60 while the outer extremity thereof, of course, remains seated on the adjacent portion of the bolt nose 38.

It will be noted that the compression spring 56 also urges the bight 44 of the U-shaped extension 40 into operative relationship with the opposite side of the body 64 of the retainer 60, thus causing the retainer to prevent undue projection of the bolt member 36 from the tubular body 20 of the housing 12.

One of the distinct advantages of the construction of my invention is the fact that should the need for replacement of either the bolt member 36 or the projecting spring 56 therefor arise in the field, trouble-free removal of the defective part can be accomplished by the simple expedient of withdrawing the retainer 60 from operative relationship with the tubular body 20 of the housing 12, thus permitting both the bolt member 36 and the associated spring 56 to be readily withdrawn therefrom and either of them to be readily replaced and reinserted in the housing.

In the field, a pin or nail can easily be used as the installation tool in re-establishing the operative relationship of the retainer 60 with the tubular housing 20 and the associated bolt member 36 and bolt projecting spring 56.

I thus provide by my invention a latch which is characterized by a minimum number of component parts which can be readily and easily assembled and dis-assembled into or from operative relationship with one another. Also characteristic of my invention is the relatively free bolt action achieved by the limited frictional engagement of the laterally protruding projections or bosses 52 upon the bight 44 of the bolt extension 40 which, while serving to guide the bolt member 36, provide a minimum of frictional resistance to free movement of said bolt member.

Another significant aspect of the invention lies in the ease with which the bolt can be removed from the tubular body of the latch. Moreover, since the body has no internal projections thereupon, the bolt assembly can be inserted from either end of the body and is similarly removable from either end.

I claim as my invention:

1. In a latch, the combination of: a housing open at its opposite extremities and having oppositely disposed openings in the wall thereof; a unitary bolt structure insertible in said housing and including a bolt nose and bolt extension provided thereupon; a bolt spring engageable with said nose; and a snap-in retainer mounted in said openings to provide a seat for said spring and retain said bolt structure against displacement from said housing, said retainer having spaced apart legs incorporating retention protuberances engageable with said housing which are movable toward each other to permit said retainer to be readily removed from operative relationship with said housing.

2. In a latch, the combination of: a housing open at its opposite extremities and having oppositely disposed openings in the wall thereof; a unitary bolt structure in-

sertible in said housing and including a bolt nose and bolt extension provided thereupon; a bolt spring engageable with said nose; and a retainer mounted in said openings to provide a seat for said spring and retain said bolt structure against displacement from said housing, said retainer having spring biased protuberances thereupon intermediate the extremities thereof and engageable with a side wall of said housing to maintain it in operative relationship therewith.

3. In a latch, the combination of: a housing open at its opposite extremities and having oppositely disposed openings in the wall thereof; a unitary bolt structure insertible in said housing and including a bolt nose and bolt extension provided thereupon, said extension having an elongated opening defining an elongated spring receptacle in conjunction with said bolt; a bolt spring wholly located in said receptacle to permit said bolt structure and spring to be readily inserted in said housing as a unit; and a retainer mounted in said openings to provide a seat for said spring and retain said bolt structure against displacement from said housing, said retainer having spaced apart legs incorporating retention protuberances engageable with said housing which are movable toward each other

to permit said retainer to be readily removed from operative relationship with said housing.

4. In a latch, the combination of: a housing open at its opposite extremities and having oppositely disposed openings in the wall thereof; a unitary bolt structure insertible in said housing and including a bolt nose and bolt extension provided thereupon; a bolt spring engageable with said nose; and a retainer mounted in said openings to provide a seat for said spring and retain said bolt structure against displacement from said housing, said retainer having a head engageable with a side wall of said housing and incorporating parallel legs spanning said housing, at least one of said legs being provided with means engageable with a side wall of said housing to maintain said retainer in operative relationship therewith.

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