Dec. 5, 1950 A. F. LICKTEIG 2,532,630

NIGHT LATCH

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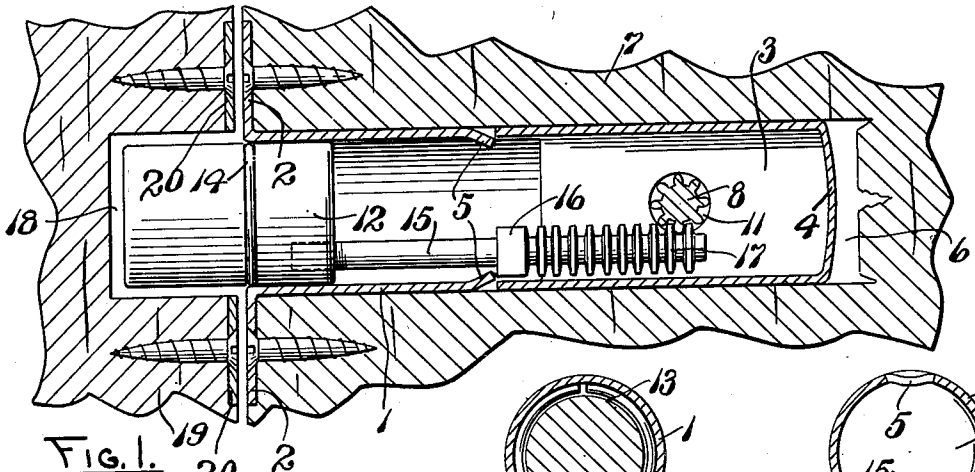


FIG. 1.

FIG. 4.

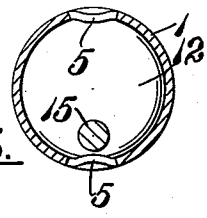


FIG. 5.

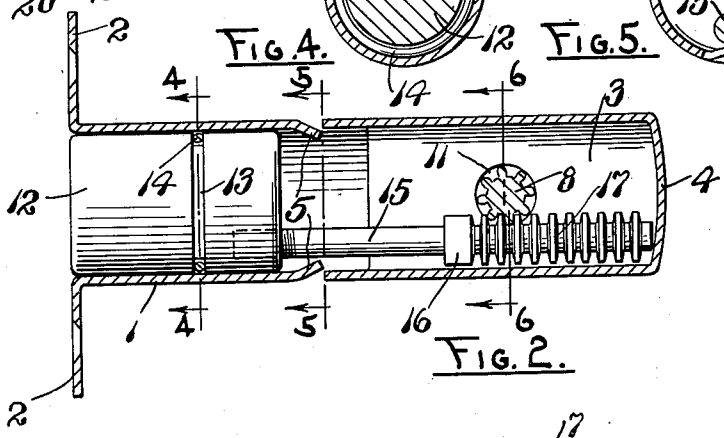


FIG. 2.

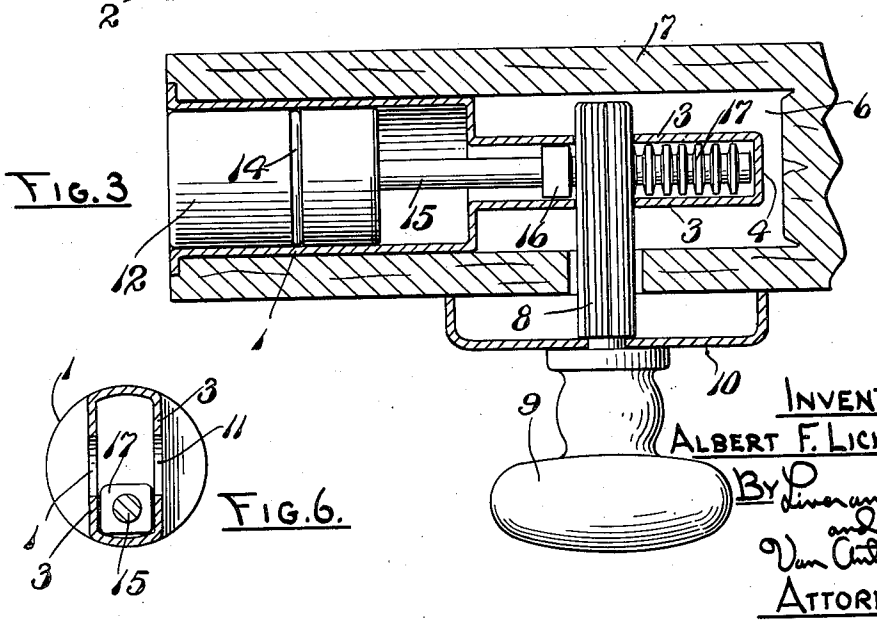


FIG. 3

FIG. 6.

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NIGHT LATCH

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4 Claims. (Cl. 292—142)

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The present invention is concerned with a novel structure of night latch or bolt. The primary object of the present invention is to produce a night latch or bolt more economically than heretofore, and one which has greatly increased length of service over comparable structures. The fabrication of the parts and their assembly is simplified and economized and, in the heretofore weakest feature of latches of this character, a very simple and practical novel structure is provided for adjustment and change of connection of the operating spindle with the movable bolt structure to a plurality of different positions, in each of which the latch structure has a life of service equal to those heretofore made, so that the life of service may be multiplied as many times as there are adjustments for connecting the operating spindle and the bolt. In practice in the present invention, the structure has a possibility of four times the length of service of projection latch bolts of a generally like character.

Furthermore, with this invention, the parts are fabricated using large quantity economical methods of production available because of the novel constructions which have been provided. The invention also for a further object has a stabilizing of the movement of the bolt in the housing and a prevention of rotative movement of the projectable portion of the bolt about its longitudinal axis in a cylindrical housing, which is easily and economically installed upon a door upon which it is to be used.

An understanding of the invention may be had from the following description, taken in connection with the accompanying drawing, in which,

Fig. 1 is a vertical section through fragmentary adjacent portions of a door and a door casing or jamb, with the bolt housing in longitudinal section and the bolt and its actuating mechanism shown in elevation, the bolt being in locking position,

Fig. 2 is a view similar to Fig. 1 of the latch bolt structure, with the bolt withdrawn,

Fig. 3 is a horizontal section through the door and latch housing, with the bolt and retracting mechanism therefor in plan, and

Figs. 4, 5 and 6 are transverse vertical sections through the latch bolt construction on the planes, respectively, of lines 4—4, 5—5 and 6—6 of Fig. 2, looking in the direction indicated by the arrows.

Like reference characters refer to like parts in the different figures of the drawing.

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The night latch structure of my invention includes a housing formed of sheet metal, the outer end portion of which is of cylindrical form, as indicated at 1, having an open outer end and with attached flanges 2 extending at the open end in opposite directions. The inner portion of the housing is of a generally rectangular form in cross section, having parallel spaced sides 3, a closed inner end 4, and upper and lower sides which are continuations of the cylindrical front portion for the width between the sides 3. There are shoulders, as best shown in Fig. 3, transverse of the housing in the integral connection of the sides 3 to the front cylindrical section of the housing. At opposite sides and in the general plane of the inner portion of the housing, two tongues 5 are pressed inwardly as shown, a short distance outwardly from said shoulders.

The housing described with the night latch bolt movably mounted therein, as hereinafter described, is adapted to be inserted into a horizontal cylindrical opening 6 for the bolt at the free vertical edge of a hingedly mounted door 7, and with the flanges 2 adapted to be screw connected to the door in the usual manner.

The operating spindle for the latch bolt comprises a long pinion 8 having a knob 9 connected therewith at its outer end. Associated with the spindle and knob at their juncture is an escutcheon or rose 10, which may lie against a side of the door 7 and be secured thereto by screws or other fastenings in the usual manner. The pinion extends through a suitable opening at the side of the door at which the knob is mounted, which opening reaches to the cylindrical boring at 6. The pinion 8 is of a sufficient length that it extends through opposed circular openings 11 in the sides 3 of the inner part of the housing. It is guided in its rotative movements by the sides of the housing. The openings 11 have centers substantially midway between the upper and lower sides of the housing.

The latch bolt is a cylindrical body 12 of metal of a length such that when in its operation it is retracted to release a door, as in Fig. 2, the inner end of the bolt 12 does not reach to the tongues 5, though approaching them. Between its ends, an annular groove 13 is made around the cylindrical bolt, in which a normally expanding spring ring 14 parted at one side and preferably made of wire, is located, the tendency of which is for the ring to open at its parting and press outwardly, so that it bears with a relatively light frictional pressure against the inner sides of the cylindrical outer section 1 of the

housing. This steadies and stabilizes the bolt in its movement and prevents rattling or aimless movement of it.

The night latch structure is completed by an actuating member which is a screw machine product, made preferably from square bar stock. At its outer end portion a bar square in cross section is machined to make a rod 15 circular in cross section, exteriorly threaded at its outer end and adapted for screw connection with the bolt 12 at its rear portion, threading into an interiorly threaded opening made therein for the rod. Substantially at the middle portion of the rod stock used, a short length indicated at 16 is not machined, but left as a short block in its square form. Back of or inwardly of the block 16 the square rod stock is machined in a successive series of spaced grooves, leaving between the successive grooves, which are made entirely around the rod, a series of rack teeth 17, which in effect provide four racks, one above, one below, and one at each side of the axis of the rod 15.

The attachment of the rod 15 to the bolt 12 is at a position eccentric to the longitudinal axis of said bolt and so located that when the rod 15, and the attached rack structure 17 secured to the bolt, is inserted in the housing, one side of the rack comes underneath the elongated spindle pinion 8, the teeth of which engage with the side of the rack which is located at the upper side of the actuating member described.

When thus assembled, by turning the knob 9, the bolt 12 may be moved outwardly to enter an opening 18 in the door jamb or casing 19, to which the free edge of the mounted door comes into opposition when it is closed, and in accordance with the usual practice, a plate 20, with an opening for passage of the bolt, is secured to the jamb as shown. Such outward movement is stopped when the block 16 comes to a tongue 5. One only of said tongues will serve as a stop, as shown in Fig. 1, but two of them are provided, diametrically opposite each other, for facility in assembling the parts of the structure, with an insurance that a stop tongue 5 will be properly positioned in the path of movement of the block 16. In latch bolts of this character, with their relatively weak rack teeth, there is a possibility of the teeth which engage the pinion 8 becoming worn and in time becoming weakened so that one or more of the teeth break. The bolt and the connected actuating member therefor may thereupon be withdrawn from the housing and the actuating member turned through an arc of ninety degrees, by reason of its screw connection to the bolt 12, thus presenting a new rack for pinion connection and engagement. There are available in effect four distinct racks in the rack structure 17 for the operating pinion 8 to successively engage. The life of service of the latch is correspondingly increased.

A further advantage of the latch is that the most desirable materials may be used for the bolt and the actuating member connected thereto. As one example, the bolt 12, preferably, may be of brass rather than of steel for elimination of rust and corrosion to which steel is subject, except in the very expensive and hard to work

chromium steel and which, economically, is not suitable for latches of this character. The actuating member, consisting of the rod 15 and the rack teeth 17, on the other hand, preferably will be of a relatively low carbon steel, and for the desirable properties and qualities of such material in connection with the rack part thereof which is subjected to the hardest service.

The invention is economical to produce. The fabrication of the housing is the same as heretofore, with substantially no gain in advantage and with no loss. The actuating spindle 8 and its attached knob 9 are as heretofore, without advantage or disadvantage in comparison with prior structures. The bolt 12 is very rapidly produced in large quantities and at very low cost and of a desired best material. The actuating member connected with it, made of the best material for it, is an automatic screw machine product of very high quantity economical production, and with its four-rack advantages. The economy in manufacture over the previous practice is marked, in addition to the longer life and other advantages which have been recited.

The invention is defined in the appended claims and is to be considered comprehensive of all forms of structure coming within their scope.

I claim:

1. A latch comprising a housing having a cylindrical outer portion and a flattened inner portion, a latch bolt slidably mounted in said cylindrical portion, a stem rotatably connected to said bolt, a rack formed integrally with said stem and slidably located in the flattened portion of the housing, said rack being square in cross section and of approximately the same thickness as the width of the flattened portion of the casing and having rack teeth on more than one of its sides, and a spindle extending transversely through said flattened part of the housing and having gear teeth meshing with the teeth on one side of the rack.

2. The elements of claim 1 combined with an annular groove in the outer surface of the latch bolt and an expanding spring split ring in said groove frictionally engageable with the inner surface of the cylindrical portion of the housing.

3. The elements of claim 1 in which said spindle holds said rack in close proximity to one of the shorter sides of the flattened portion of the housing.

4. The elements of claim 1 in which said spindle is removable and a stop extending inwardly in said housing and engageable with the rack when the spindle is in position to limit outward movement of the rack.

ALBERT F. LICKTEIG.

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