March 23, 1954 H. E. FROST 2,673,109

SCREEN DOOR LATCH

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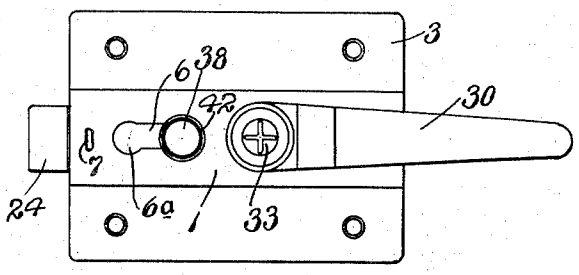


FIG. 1.

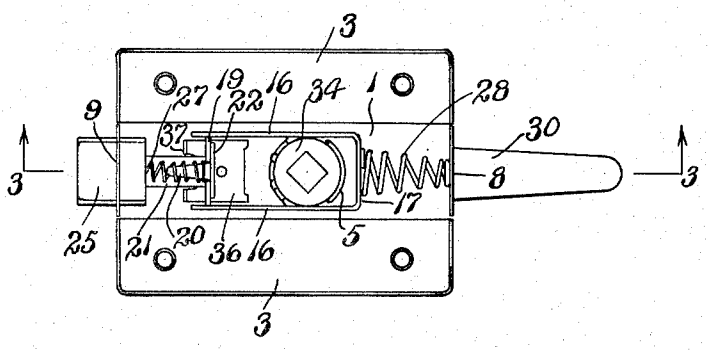


FIG. 2.

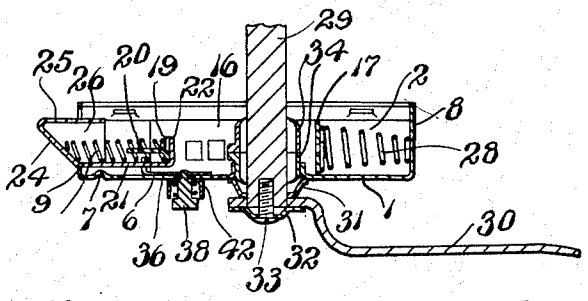


FIG. 3.

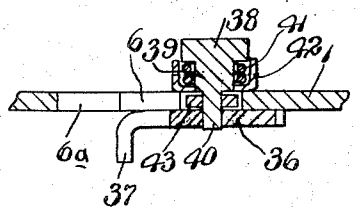


FIG. 4.

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SCREEN DOOR LATCH

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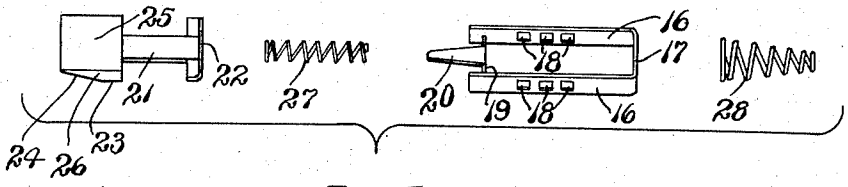


FIG. 5.

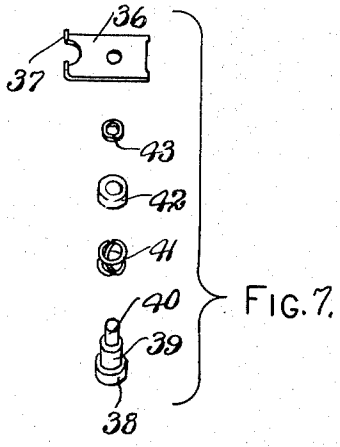
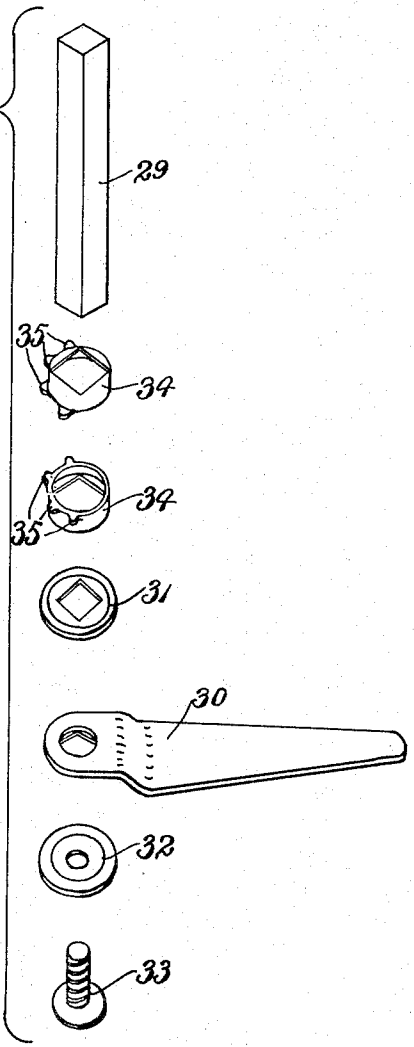


FIG. 7.

FIG. 6.



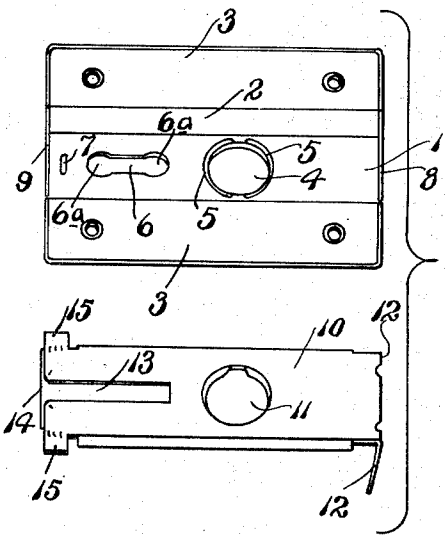


FIG. 8.

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SCREEN DOOR LATCH

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2 Claims. (Cl. 292—172)

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This invention is directed to a practical, novel and exceptionally economical structure of screen door latch, and is more concerned with improvements in connection with the latch bolt and retractor therefor, together with a novel, manually operable locking means to hold the latch bolt locked in its door closing position so that the bolt cannot be retracted until the lock has been manually moved to an inoperative position.

A primary object and purpose of the invention is to provide latch bolt and retractor mechanism which can be manufactured at a minimum of cost, which is easily assembled, in which most of the parts may be produced in large quantity and with rapidity by punch press operations, and at the same time obtain a latch of sturdy and durable character which has a long life and is not subject to getting out of order.

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

Fig. 1 is an outside elevation of the latch made in accordance with my invention.

Fig. 2 is a like elevation from the opposite or inner side thereof, with the bottom plate of the latch housing removed.

Fig. 3 is a central longitudinal section through the latch structure, substantially on the plane of line 3—3 of Fig. 2.

Fig. 4 is a fragmentary enlarged section of the bolt locking means used, likewise on the plane of line 3—3 of Fig. 2, showing the lock appearing in Fig. 2 enlarged.

Fig. 5 shows in perspective the retractor and bolt elements disassembled.

Fig. 6 is a similar perspective view of the several parts which are used in conjunction with the spindle and handle assembly for manually operating the retractor to withdraw the locking bolt.

Fig. 7 is a similar perspective view of the disassembled parts of the lock, and

Fig. 8 is a perspective view of the latch housing and under closing plate disassembled.

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

The latch housing, made of flat metal, has an elongated outer side 1 from the side edges of which two spaced sides 2 extend substantially at right angles and terminate in opposite, outwardly extending, attaching flanges 3 having openings for the passage of screws. In the outer side 1 a generally circular opening 4 is cut which is partially surrounded by an inwardly extending rib or flange 5 as shown. Toward the outer end

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of the outer side 1 an elongated slot 6 is cut, having parallel sides which slot at each end is enlarged into a circular enlargement 6a as best shown in Fig. 8. Outwardly beyond such slot the metal of the outer side 1 is pressed inwardly making an interior transverse rib 7 which has a length generally equal substantially to the width of the slot 6, though such particular length is not any essential part of the invention. The latch housing is closed at its ends by an inner end 8 bent at right angles from the adjacent end of the outer side 1, and an outer end 9 similarly bent. The outer end 9 has a rectangular opening therethrough for the passage of the head of the latch bolt.

After the bolt and retractor have been assembled within the described housing or casing, its inner side is closed by a bottom member in the form of an elongated flat plate 10 which, at each longitudinal edge, for the major portion of its length, but short of each end, is formed with a narrow elongated flange. The plate 10 has an opening 11 therethrough of the same size as the opening 4 in the top 1, and aligned therewith and, likewise, substantially surrounded at its inner side by a flange comparative to the flange 5. At the inner end of the base plate 10 two spaced flexible somewhat curved fingers 12 are integrally formed. At the outer end portion and midway between its sides, the metal of the base is pressed to form an interior rib 13 and an outwardly extending lip 14 (Fig. 8) which, when the base is assembled with the latch housing, is received at one side of the bolt passing opening at the end 9 of the housing. And adjacent the outer end of the base plate 10 are outwardly extending ears 15 one at each side.

Such base plate is assembled by inserting the lip at 14 at the inner side of the opening made in the outer end 9 of the housing, and then forcing the spaced resilient fingers 12 into the housing, bearing against the inner side of the end 8 of the housing and snapping into place, being securely held against displacement when thus assembled.

The interior structure of the latch includes a retractor which is formed from a single length of flat metal into a U-shape having parallel spaced sides 16, connected at their inner ends by an integral end member 17. The sides 16 have a number of spaced openings 18 cut or punched therethrough (Fig. 5) which are in directly opposed relation to each other. The free ends of the sides 16 are connected together by a cross bar 19 from which an integral finger or

tongue 20 extends in an outward direction. The retractor accordingly is a somewhat elongated rectangular frame which, when assembled within the housing as shown in Figs. 2 and 3, bears against the inner side of the top 1 of the housing and rides thereagainst and is guided by the housing sides 2.

With the retractor a latch bolt is associated and combined. The latch bolt is also made from a single piece of sheet metal, including in its structure a bar 21 of relatively narrow width, from the inner end of which a wing 22 is bent to extend at right angles, being adapted to come against the inner side of the bar 19 of the retractor. Integral with the outer end of the bar 21 is the bolt head which includes a short flat section 23 integrally connected with the outer end of the bar 21 and from which a beveled section 24 extends outwardly, is thence turned back in a section 25 spaced from and parallel to the opposite section 23. From each side edge of the section 25, sides 26 are bent and shaped reaching to the beveled section 24 and its connected section 23. The bolt head, accordingly, is open at its inner end and receives the outer end portion of a light strength coiled compression spring 27, the opposite or inner end portion of said spring being located around the projecting tongue 20 of the retractor.

From this construction it is evident that the bolt may be moved inwardly by pressure thereon without any change in position of the retractor. Thus when the latch is secured on a screen door, or other door, and is swung to closed position, the beveled portion 24 of the latch riding upon a suitable strike or keeper, the bolt is automatically moved inward, the strength of the light spring 27 only being overcome and the retractor remaining in fixed position. When, however, the retractor is moved inwardly, bar 19 thereof coming against the wing 22 will move or pull the bolt inwardly with the inward movement of the retractor. Between the end 17 of the retractor and the inner end 8 of the housing a coiled compression spring 28 of greater strength than the spring 27 is located. It is compressed and overcome when the retractor is moved inwardly to retract the bolt by mechanism about to be described.

The mechanism for operating the retractor includes a spindle 29, square in cross section, which passes through the openings 4 and 11 of the housing and its closing base. At its outer end a handle 30 is detachably connected thereto. The handle, at its connected end, is between two washers 31 and 32 and is secured to the spindle by screw 33 passing through the outer washer 32 and threading into the spindle 29. On the spindle between the opposite sides of the retractor are two rollbacks 34 each of a generally cup-like form and each having a succession of spaced gear or pinion teeth 35 projecting therefrom. Each of the rollbacks likewise has a square opening through it for the passage of the spindle 29. The two rollbacks are placed together with their open ends engaging and the teeth so located that upon rotating the spindle in one direction, such teeth consecutively engage the openings 18 in one side 16 of the retractor, moving such retractor inwardly. When turned in the other direction, the teeth engage the openings 18 of the opposite side 16 likewise moving the retractor inwardly and retracting the bolt. Accordingly, irrespective of the direction of the turning movement of the handle 30 the bolt is withdrawn. The rollbacks are held in position by upsetting the metal of the spindle at opposite corners thereof so as to engage against the inner rollback and hold it and the other rollback against movement lengthwise of the spindle inwardly, or outwardly against the washer 31.

To hold the bolt in its outer operative position, a manually operative lock is mounted on the housing at the slot 6 therethrough. The lock includes a flat plate 36, at one end having two spaced projections 37. This plate is located at the inner side of the side 1 of the housing with the projections 7 extending inwardly, one at each side of the bar 21 of the latch bolt. An operating member is secured to the plate 36. Such member comprises a cylindrical head 38, which has integrally extending therefrom a shank 39 of less diameter than the head 38, and also having a diameter less than the distance between the sides of the slot 6. From the shank 39 an integral pin 41 of still less diameter extends, passing through the plate 36 and being riveted over at its free end to make a permanent connection. The head 38 is at the outer side of the latch. A short coiled spring 41 surrounds the shank 39, and a cup-like housing 42 has an opening through which the shank 39 passes and is of a size so as to surround the head 39. On the shank 39 a collar 43, having a diameter greater than the distance between the sides of the slot 6 and less than the diameter of the enlargements 6a at the end of the slot, is secured. While shown as a separate member in Fig. 7 and capable of being made separately, in practice it is preferred to make this collar integral with the shank 39.

In operation, the spring 41 under compression tends to force the head 38 outwardly and move the collar 43 into an enlargement 6a at an end of slot 6. In such position the lock cannot be moved. By pressing upon the head 38 to compress the spring 41, the collar 43 and the plate 36 are moved so that the collar and attached parts may be moved outwardly, the collar being positioned inside the top housing member 1, remaining in such position during the outward movement until the enlarged outer portion 6a of the slot 6 is reached, whereupon spring 41 projects the parts outwardly, the collar 43 engaging in said enlarged end 6a and locking the parts in position until the head 38 is again forced inwardly by manual pressure thereupon.

When the lock is moved outwardly to its operative position the projections 37 come against the inner end of the bolt head preventing its being withdrawn or retracted.

It is to be understood that the head of the bolt, when the bolt is retracted, rides against the rib 7, the bolt being guided at its inner and outer sides between said rib 7 and the lip 14 at the outer end of the bottom plate of the latch housing. The bar 19 is of lesser width than the width of the sides 16 of the retractor, permitting the bar 21 of the latch bolt to pass between it and the locking plate 36. The locking plate is of a width less than the distance between the sides 16 of the retractor between which located serving to help guide the retractor in its inward and outward movements.

The structure described is of a very economical nature and type. The weight of metal used is at a minimum. The fabrication thereof by punch press, die operations is very rapid and large quantity production is obtained at a minimum of expense.

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. In a latch having an elongated housing, and a retractor operated latch bolt having a bolt head adapted to project at one end beyond the adjacent end of the housing, the improvement comprising, a locking plate adapted to be received within said housing and moved lengthwise thereof having an outer end adapted to engage against the inner end of the bolt head when said head and locking plate are both in outer position, and manually operated spring actuated means connected with said locking plate extending through said housing to outside thereof, said housing having an elongated slot for such spring actuated means to traverse in moving the plate in said housing, and cooperating means on said housing and spring actuated means automatically engaging and holding the locking plate in outer position when moved thereto under spring actuation of said spring actuating means, and adapted to be disengaged by manual operation of said means.

2. In a latch having an elongated housing and a retractor operated bolt, having a bolt head normally extending through and projecting beyond one end of the housing, the improvement comprising, a locking plate adapted to be received within said housing and moved back and forth lengthwise thereof, having an outer end adapted to engage said bolt head when the bolt head and plate are both in outer position, a member connected at its inner end to said locking plate extending through a side of the housing, said housing side having an elongated slot, enlarged and closed at both ends through which member passes, spring means acting on said member normally moving said member and locking plate outwardly, and an enlarged member on said first member adapted to be received in either enlarged end of said slot when free to enter therein under the force of said spring means, and adapted to be moved out thereof on manual inward pressure against said first member to move it and attached locking plate bodily inward against said spring means.

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References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
1,762,499	Baume	June 10, 1930
2,253,257	Wellman	Aug. 19, 1941
2,533,023	Lickteig	Dec. 5, 1950
2,547,108	Anderson	Apr. 3, 1951