

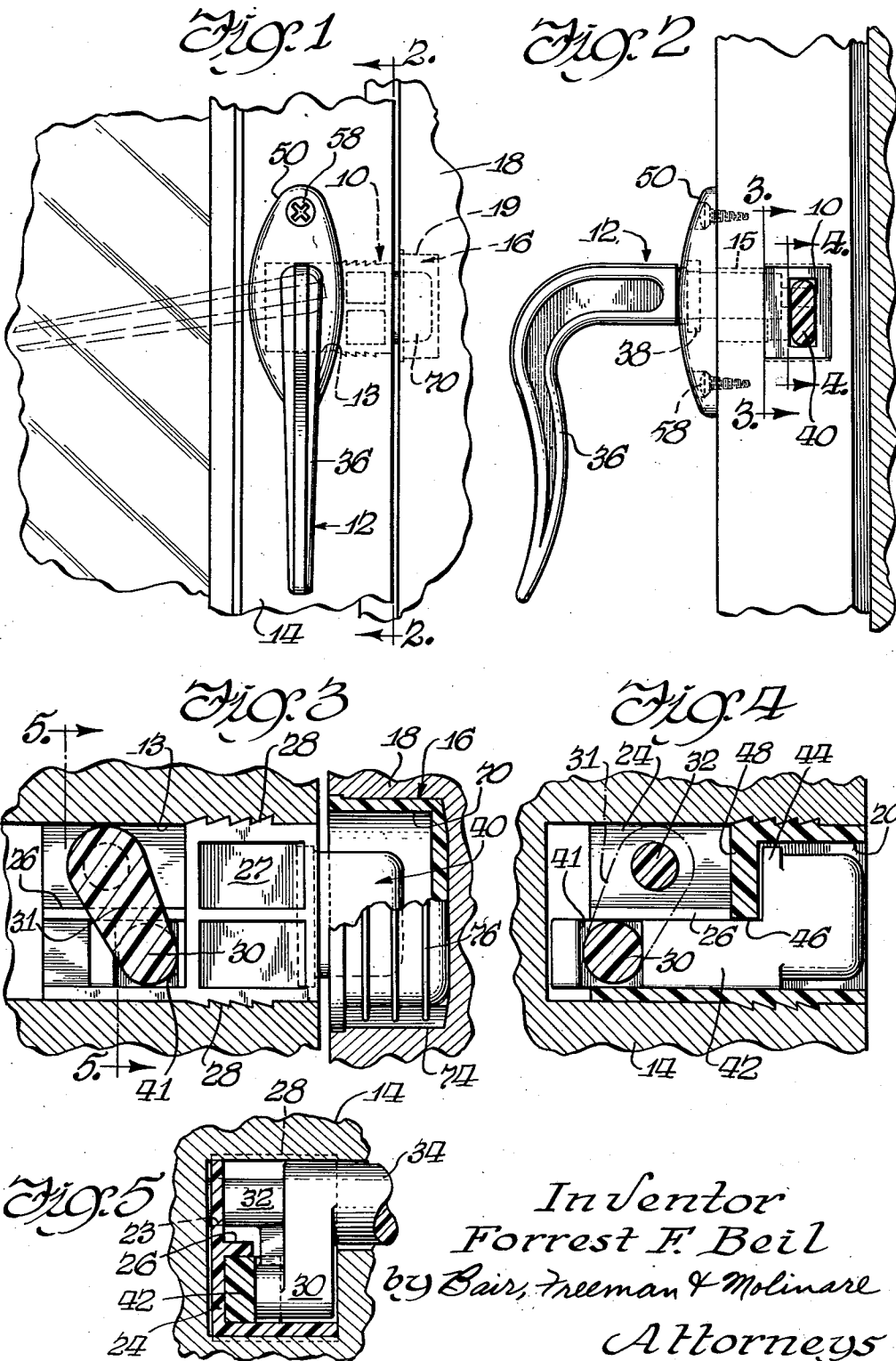
June 11, 1957

F. F. BEIL
WINDOW LOCK

2,795,445

Filed May 9, 1955

2 Sheets-Sheet 1



Inventor
Forrest F. Beil
by Bair, Freeman & Molinare
Attorneys

June 11, 1957

F. F. BEIL
WINDOW LOCK

2,795,445

Filed May 9, 1955

2 Sheets-Sheet 2

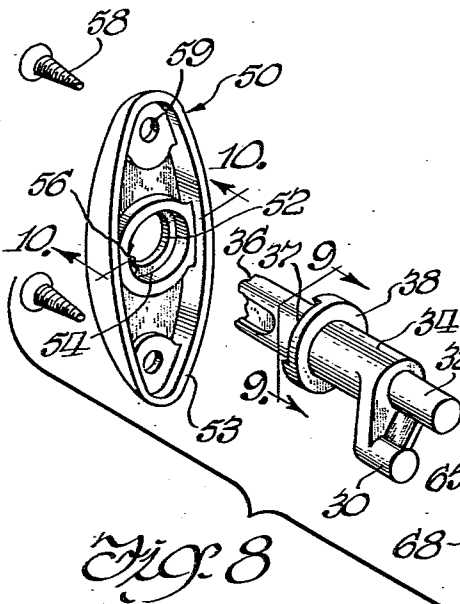
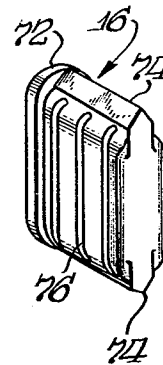
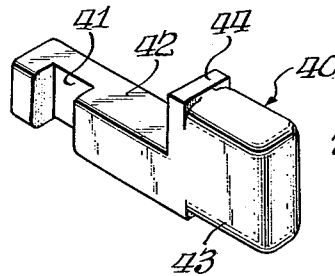
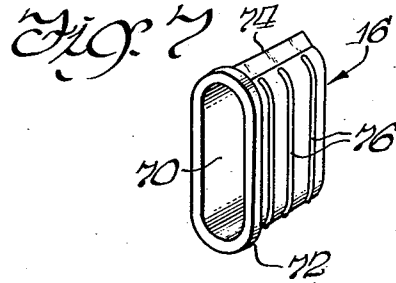
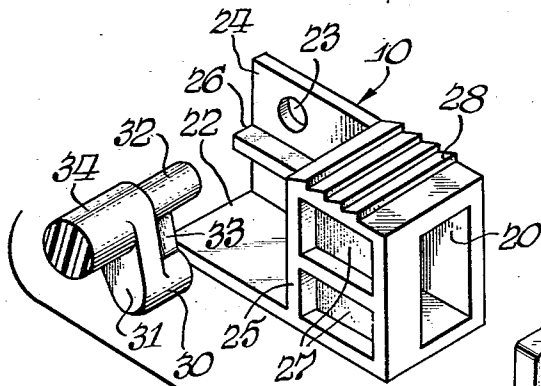


Fig. 9

Fig. 10

Inventor
Forrest F. Beil

by Bair, Freeman & Molinare
Attorneys

1

2,795,445

WINDOW LOCK

Forrest F. Beil, Clinton, Iowa, assignor to Curtis Companies Incorporated, Clinton, Iowa, a corporation of Iowa

Application May 9, 1955, Serial No. 506,724

5 Claims. (Cl. 292—140)

This invention relates to a lock or latch structure suitable for use in securing a movable member to another movable or stationary member, as for example, in windows, gates, doors and the like. The construction shown in the accompanying drawings and described in detail in the specification is particularly adapted for use in latching hinged frame windows of the casement type and comprises a bolt mounted in the window rail having a handle for opening and closing the window and actuating the bolt, and a cooperating strike plate mounted in the window jamb adapted to receive the bolt for locking the window. Obviously, the invention is susceptible of other uses and various modifications in the construction and design of the parts will become apparent to those who are skilled in the art from the following description. It is, therefore, not my intention to limit this invention other than as necessitated by the scope of the appended claims.

One object of my invention is to provide a lock of the type described which is simple in design so as to permit economical manufacture by molding the parts from plastic material.

Another object is to provide a lock structure having a minimum number of parts which can be easily and quickly installed with a minimum number of fasteners.

Another object is to provide a lock structure of this type in which the bolt member moves axially by rotating the handle and which has a tapered or rounded end for engaging the sides of the cooperating strike plate to apply closing pressure, as for example, when the window is being closed against the compressive force of weather stripping.

Another object is to provide a bolt housing and strike plate molded from tough, horny, resilient plastic material, these parts having ribs on the external surfaces thereof so that the part may be pressed into a slot provided therefor in the wooden window structures and locked in place without anchoring fasteners.

These and other objects and advantages of my invention will become apparent from the following description when read in conjunction with the accompanying drawings, in which:

Figure 1 is a front elevational view of the complete lock structure installed in a casement window. Only fragments of the window rail and jamb are shown;

Figure 2 is a sectional view taken along the line 2—2 of Figure 1;

Figure 3 is an enlarged sectional view through frame members taken along the line 3—3 of Figure 2, the strike plate being broken away to show the cavity;

Figure 4 is a similar enlarged sectional view taken along the line 4—4 of Figure 2;

Figure 5 is a sectional view taken along the line 5—5 of Figure 3;

Figure 6 is an exploded perspective view of several parts comprising the lock assembly including the bolt, bolt housing, bolt actuating cam, and the cooperating strike plate;

2

Figure 7 is a perspective view of the strike plate looking into the bolt receiving cavity;

Figure 8 is an exploded perspective view of the escutcheon retaining plate, the cam and its actuating shaft, and the bearing plate which cooperate with the bolt assembly;

Figure 9 is a sectional view taken along the line 9—9 of Figure 8; and

Figure 10 is a fragmentary sectional view taken along the line 10—10 of Figure 8.

Referring now to the drawings, the bolt housing 10, the bolt 40, and the handle assembly 12 are mounted in the rail 14 of the window which is adapted to swing on hinges fixed to an opposed rail (not shown) to the left of the rail 14, illustrated in Figure 1. It will be understood, of course, that the lock structure may also be employed in any door or window-like structures where two members move past each other. The strike plate 16 has a cavity 70 adapted to receive the bolt 40 and is mounted in a slot 19 provided therefor in the window jamb 18, the strike plate being opposed to the bolt housing when the window is closed.

The bolt housing 10 is a unitary molded part of generally rectangular shape having a cavity or opening 20 in one end adapted to receive the sliding bolt 40. The cavity 20 terminates in a bottom wall 48 (Figure 4) having an opening 46 therethrough for a purpose pointed out hereinafter. The housing is preferably molded from a tough, horny, resilient material which has high impact strength. As best shown in Figure 6, the bottom 22 and one side 24 of the bolt housing extend outwardly from the housing proper to provide a way for the bolt 40 and for supporting the cam 30 which actuates the bolt. The bolt 40 has a rather large head 43 adapted to enter the cavity in the strike plate, and a projecting narrow portion 42 extending from the head. A shoulder 44 is provided between the head 43 and the narrow portion 42 which strikes the bottom wall 48 of the cavity 20 when the bolt is retracted into the slot, thus limiting its travel in this direction. The opening 46 in the bottom wall 48 of the cavity 20 permits the narrow portion 42 of the bolt to pass through the wall 48. It will be noted that the narrow portion 42 has a groove or slot 41 cut in the side thereof which is adapted to receive the actuating cam 30, as described below.

A guide bar or ledge 26 projects from the inner surface of the side wall 24 and is spaced above the bottom 22 parallel thereto. The distance between the bottom 22 and the underside of the ledge 26 is just slightly greater than the height of the narrow elongated portion 42 of the bolt so that the bolt will slide freely within the way provided by these cooperating surfaces.

The width of the housing 10 is greater than required to accommodate the bolt 40 so as to provide space for the bolt actuating cam 30. The wall 25 (opposite wall 24) is, therefore, thicker than the other walls of the housing. To reduce the amount of material required for the part it is desirable to provide a pair of depressions 27 in the wall 25. This reduces the amount of material in the part without substantially decreasing its strength.

The bolt housing has ribs 28, preferably of wedge-shaped cross section, on the top and bottom surfaces thereof which are adapted to permit the housing 10 to be pressed into the opening 13 provided therefor in the end of the wooden rail 14. The apex of the wedge faces the bottom of the opening 13. The opening 13 is approximately equal in its width and length dimensions to the housing without the projecting ribs 28. Thus, when the housing is pressed into the opening 13 the wedge-shaped ribs 28 slide with relative ease into the opening 13 but because of the flat vertical surface along the trailing edge

of each rib the housing cannot slide out of the opening. Because the housing is made from resilient material it will deform upon insertion and become compressed to resist displacement. The ribs tend to become embedded in the wood.

The handle assembly 12 is a unitary member consisting of the handle 36 which terminates in a shaft 34 extending approximately at right angles to the handle proper, and a bolt actuating cam 30 extending radially from the end of the shaft 34. A stubby extension shaft 32 projects axially from the end of the shaft 34 and is adapted to fit into an opening 23 cut through the wall 24 of the housing 10. The opening 23 serves as a bearing for rotatably supporting the outer end of the handle assembly 12. In assembled position the end of the stubby shaft 32 is flush with the outer surface of the wall 23, while the inner vertical wall 31 of the cam is flush with the wall 25 of the housing. The end of web 33, between shaft 32 and cam 30, abuts against the ledge 26. The cam 30 is of round cross section and bears against the sides of the slot 41 in the narrow portion 42 of the bolt to move the bolt axially in the housing as the shaft 34 is rotated by turning the handle 36. An opening 15 is cut through the wooden rail 14 at right angles to, and joining with, the opening 13 to permit the cam carrying end of the handle assembly 12 to pass through the rail into the housing 10. To limit rotation of the shaft 34 and to hold the handle assembly in place, an escutcheon plate 50 is provided which is adapted to screw into the rail by means of the screws 58 which extend through the openings 59 provided therefor in the plate.

Intermediate handle 36 and the cam-carrying end of the shaft 34 is a collar or circumferential projection 38 (Figure 8) which extends beyond the front surface of the rail 14 when the handle is assembled in the window structure. The collar 38 has an arcuate depression or recess 37 which reduces its thickness at that point, as best shown in Figure 9. The escutcheon plate 50 has a central opening 52 through which the handle 36 extends. The margin around opening 52 has a circumferential recess or well 54 which is adapted to receive the collar 38. Provided on the bottom face of the well 54 is an axially-extending projection 56 which cooperates with the arcuate recess 37 in the collar 38 to limit the angle of rotation of the shaft 34. The extent of rotation of the actuating handle 36 is shown in Figure 1 in broken lines. The recess 37 is of greater circumferential extent than the projection 56 and the difference in arcuate extent between the depression 37 and the projection 56 determines the angle through which the handle and the shaft 34 may be rotated. In the present construction this angle is less than 90°. In this way the cam 30 is restricted in its movement so that there is no tendency to force the bolt beyond the limits of its stroke. There are, of course, other cooperating limiting factors, namely, the bolt shoulder 44 which strikes the bottom wall 48 of the cavity 20 to prevent retraction of the bolt beyond this point, and the opposite side of the bottom wall 48 against which the cam 30 strikes to prevent the bolt from being propelled outwardly beyond the point where only the head 43 is exposed.

To support the shaft 34 at a second point, and to permit preassembly of the handle assembly 12 and the escutcheon plate 50, I have provided a bearing plate 60 which consists of two halves 62 and 64, split along the line 65. These halves of the bearing plate lie within the hollow of the escutcheon plate and bear against the upper surfaces of the reinforcing portion provided around the openings 59 and 52. The peripheral axially-extending flange 53 of the escutcheon holds the halves 62 and 64 in place. The niches 68 in each of the halves 62 and 64 are provided to permit the bearing plate to be compressed slightly so that it will snap into place. The bearing plate 60 has holes 63 which align with the holes 59 in the escutcheon plate. A central circular opening 66 ex-

tending through both halves serves to support the shaft 34. The bearing plate 60 abuts against the outer surface of the wooden rail 14 when the lock is installed. When the bearing plate has been snapped into place the handle assembly 12 is then locked to the escutcheon since the collar 38 is larger than the opening 66 which surrounds the shaft 34. The escutcheon plate is adapted to slide up over the end handle 36 for purposes of assembly.

The strike plate 16 is best illustrated in Figures 6 and 7 and consists of an oval shell, the internal shape of which resembles a bath tub. The shell has an opening 70 which is slightly larger in cross section than the bolt head 43. A peripheral flange 72 extends outwardly from the margin of the opening 70 and the surface of the flange is adapted to lie flush with the wooden jamb when the plate is pressed into the slot 19 provided therefor. The upper and lower surfaces of the shell of the strike plate terminate in sharp edges 74 which are adapted to cut into the wood to prevent the strike plate from any tendency to rotate in the slot 19. Likewise, ribs 76 extend across the outer surfaces of the shell parallel with the flange 72 between the upper and lower edges 74 to prevent the strike plate from moving axially within the slot 19. If desired, the ribs 76 may be similar in design to ribs 28 on the housing 10.

As indicated above, it is particularly important that the housing 10 and the strike plate 16, both of which are adapted to be secured to the wooden frame members by means of a press fit, be made from a tough, resilient material which can be sprung into place. The openings in the wood provided for these parts are slightly under-size. Due to the resilient nature of the material from which these parts are molded they may be pressed into the wood to put the part in compression, thus holding it very tightly within its cavity. There are a number of tough, horny, plastic materials on the market which are suitable as molding compositions for these particular parts. One such material is sold under the trade name "Zytel." Nylon, high impact polystyrene, and hard polymers of styrene and butadiene plasticized with a rubbery material of the GR-S type are also satisfactory for this purpose. The material must have a relatively high tensile strength and good impact resistance over a wide temperature range.

Particular attention is called to the configuration of the nose of the bolt head 43. The rounded edges provide a wedge shape or taper which is well adapted for bringing the window into contact with the jamb by compressing the weather stripping usually placed between the two. The inner edges of the flange 72 are also rounded. The window is swung closed by means of the handle 36 with the bolt in retracted position within housing 10. The final closing pressure is applied progressively as the bolt head 43 is forced into the cavity 70 of the strike plate 16 by turning the handle 36.

It is believed that the manner in which the lock is assembled and operated is explanatory from the above description. One of the primary advantages of this construction lies in the small number of parts required to produce an efficient, easily workable lock. Few parts permit assembly with a minimum of man hours, particularly in view of the fact that no fasteners, such as the wood screws which are customarily used in securing the bolt housing and strike plate are required. Only two screws are necessary for the whole assembly, those being the screws 58 which secure the escutcheon plate to the window rail 14. The bolt housing and the strike plate are installed by pressing them into their respective openings in the window rail and jamb.

One of the foremost advantages in employing molded parts is that they may be assembled into the final unit without any further finishing. They are completely finished as they come from the mold. By the provision of a lock assembly made from molded parts in accordance

5

with this invention it has been possible to reduce the cost of the lock by over 30%, as compared with metal locks used previously.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. A lock assembly for locking a movable member to a second member, said assembly comprising a bolt slidably mounted within a housing fitted into the movable member and adapted to be pressed into locking relation with a cavity provided in said second member, said bolt having curved edges which serve to pull the movable member progressively into alignment with the second member as the bolt is propelled into the cavity of the latter, a shaft rotatably mounted within the housing normal to the path of movement to the bolt and carrying an integral cam member adapted for propelling and retracting said bolt with respect to the movable member, a handle integral with said shaft for turning the shaft and for enabling movement of the movable member, a collar on said shaft spaced intermediate said cam carrying end and said handle and an escutcheon plate through which the outer end of said shaft and said handle extend, the collar bearing against the inner face of the escutcheon, said escutcheon being secured to said movable member to hold the shaft in place.

2. The assembly of claim 1 in which the escutcheon carries a projection and the collar has a complementary recess which cooperate to limit the angle of rotation of said shaft.

3. The assembly of claim 2 including a bearing plate detachably secured to the escutcheon to confine the collar between the escutcheon and the bearing plate to permit preassembling the shaft and its integral handle and cam with the escutcheon plate.

4. A lock for hinged windows or the like comprising

6

a plurality of molded parts comprising a bolt housing adapted to be mounted in a slot in the window rail and having a way therein, a bolt adapted to slide in said way in cooperating relation with a strike plate associated with said bolt housing, a shaft rotatably mounted within said housing normal to the axis of said bolt adapted to propel or retract the bolt within said housing, a handle integral with said shaft for turning the shaft, and an escutcheon plate through which the outer end of said shaft and handle extend, said plate adapted to be secured to the window rail to hold the shaft housing and bolt in assembled relation, and said bolt housing having ribs on external surfaces thereof which increase the size of the housing beyond that of said slot, whereby the housing is compressed, when pressed into the slot, to be secured in place therein.

5. The lock of claim 4 in which the shaft carries an integral collar intermediate the cam carrying end and the handle and the escutcheon plate has a well for receiving the collar, said collar having an arcuate recess and said well having an arcuate projection of smaller circumferential extent than said recess which cooperates with said recess to limit the angle of rotation of said shaft.

References Cited in the file of this patent

UNITED STATES PATENTS

194,825	Judd	Sept. 4, 1877
241,998	King	May 24, 1881
367,827	McIntyre	Aug. 9, 1887
1,796,490	Sullivan	Mar. 17, 1931
2,186,795	Anderson	Jan. 9, 1940
2,499,165	Roethel	Feb. 28, 1950
2,612,399	Mastrangelo	Sept. 30, 1952