June 25, 1963 P. M. DOMSIC ETAL 3,095,225

AUTOMATIC DOOR LOCKING ASSEMBLIES

Filed Jan. 29, 1962 4 Sheets-Sheet 1

Fig. 1

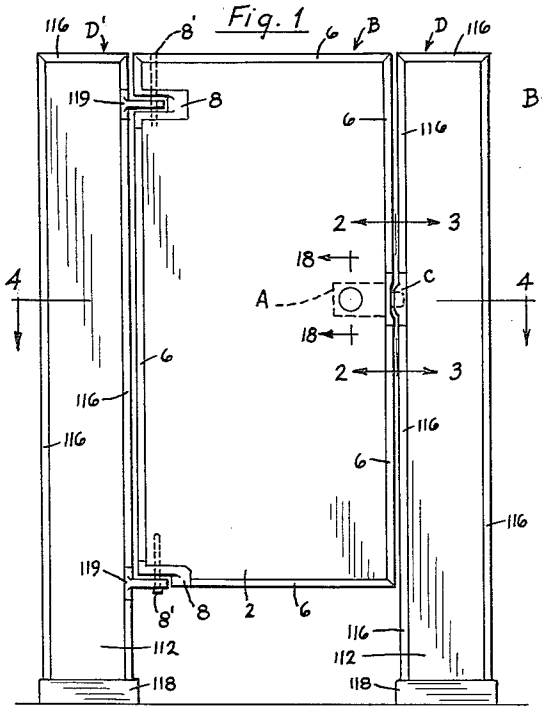


Fig. 2

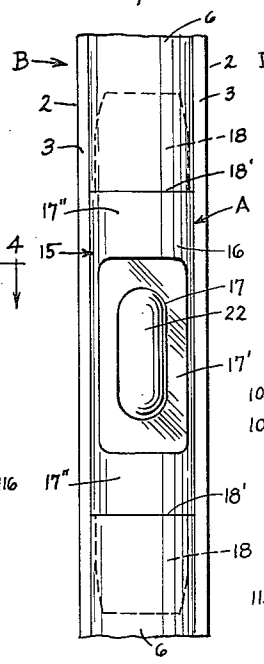


Fig. 3

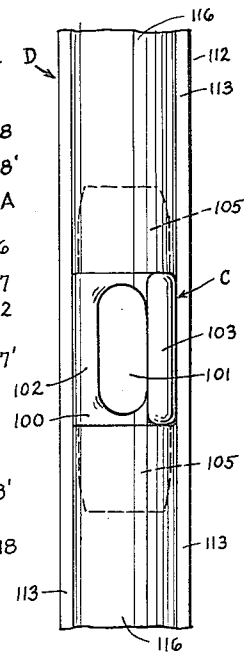


Fig. 4

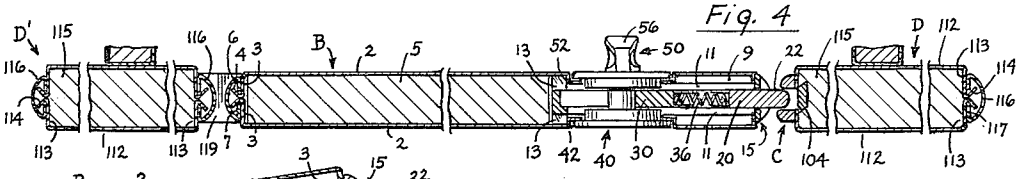


Fig. 5

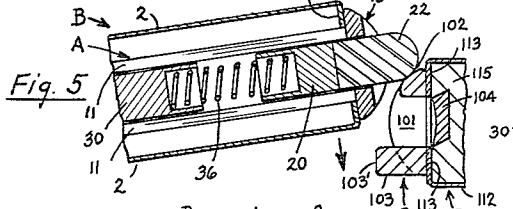


Fig. 7

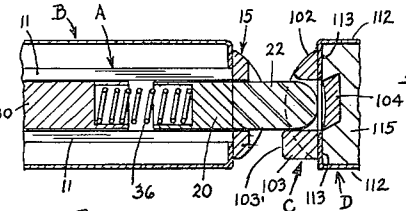


Fig. 6

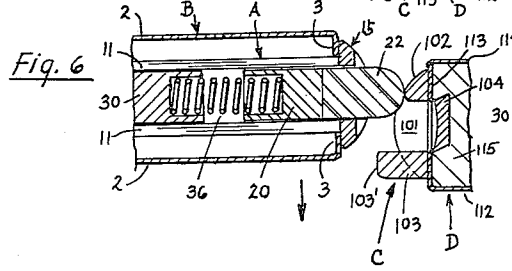
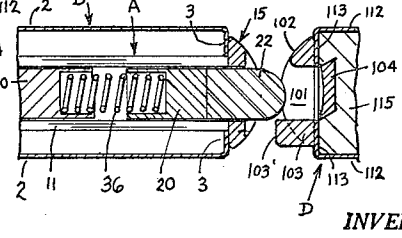


Fig. 8



INVENTORS
PAUL M. DOMSIC
HAROLD J. DIELMAN

BY

Reuben J. Carlson
Attorney

June 25, 1963 P. M. DOMSIC ETAL 3,095,225

AUTOMATIC DOOR LOCKING ASSEMBLIES

Filed Jan. 29, 1962 4 Sheets-Sheet 2

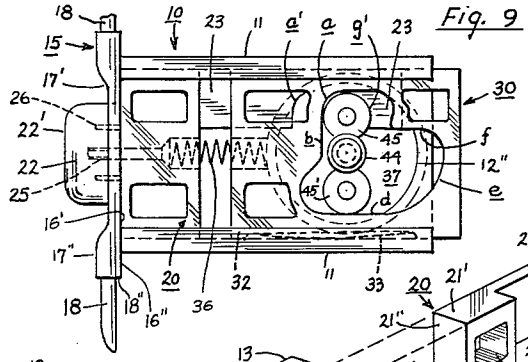


Fig. 9

Fig. 10

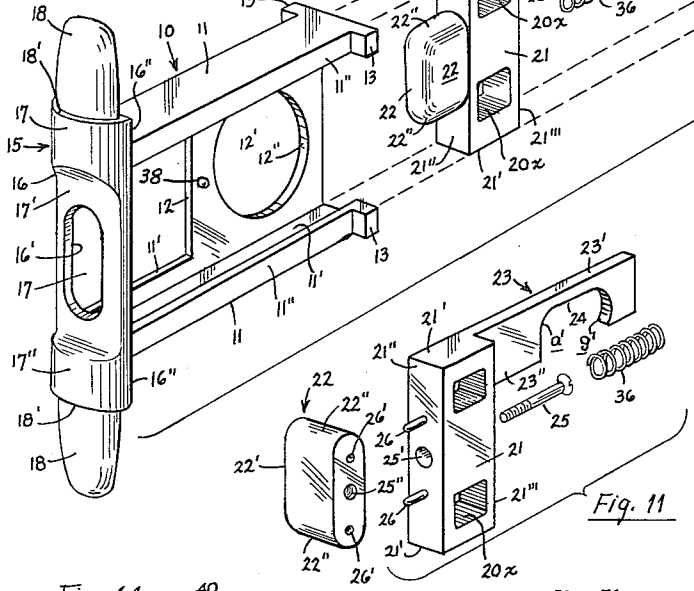


Fig. 11

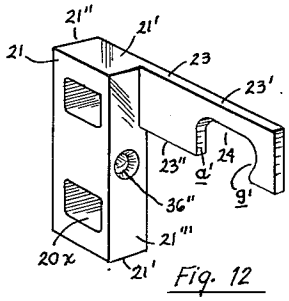


Fig. 12

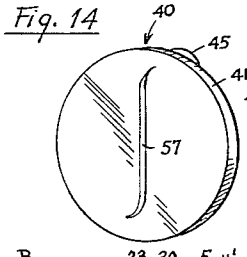


Fig. 14

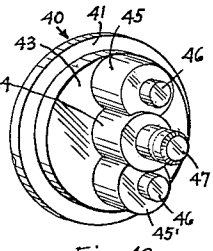


Fig. 13

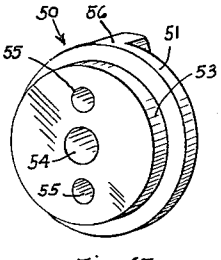


Fig. 15

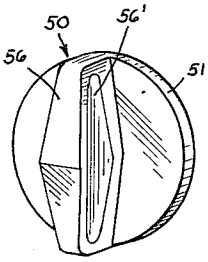


Fig. 16

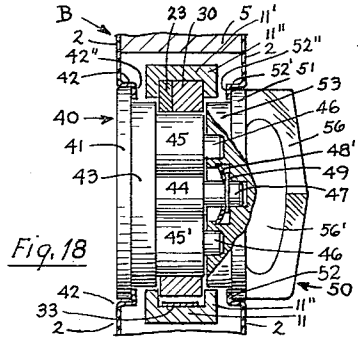


Fig. 18

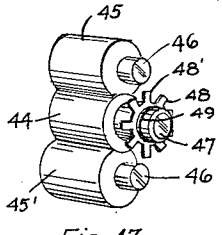


Fig. 17

INVENTORS
PAUL M. DOMSIC
HAROLD J. DIELMAN

BY Reuben J. Carlson
Attorney

June 25, 1963 P. M. DOMSIC ETAL 3,095,225

AUTOMATIC DOOR LOCKING ASSEMBLIES

Filed Jan. 29, 1962 4 Sheets-Sheet 3

FIG. 19

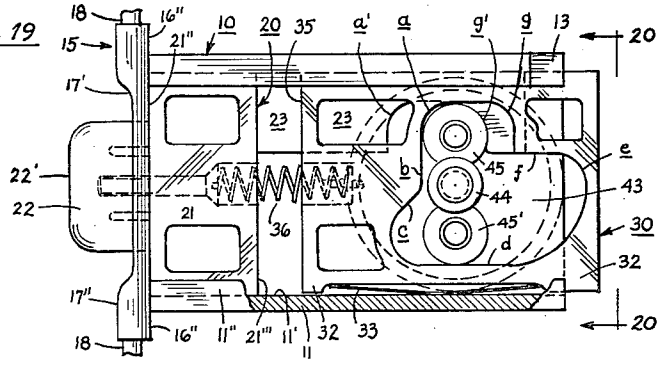


FIG. 20

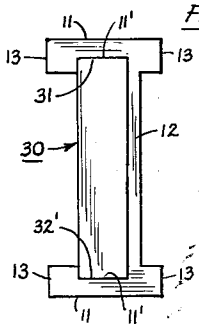


FIG. 21

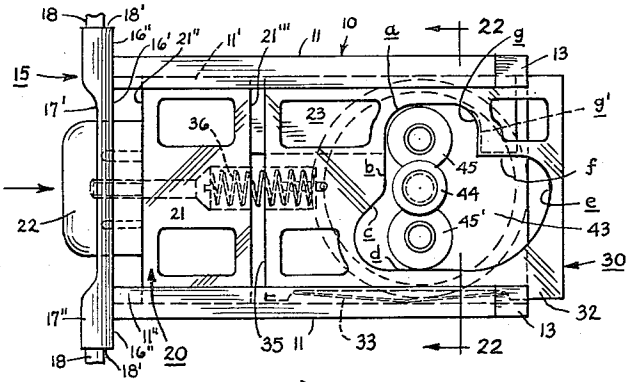


FIG. 22

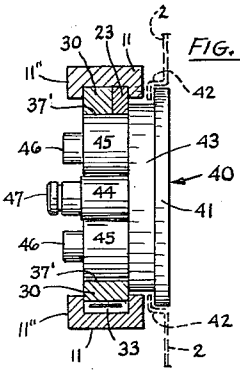


FIG. 23

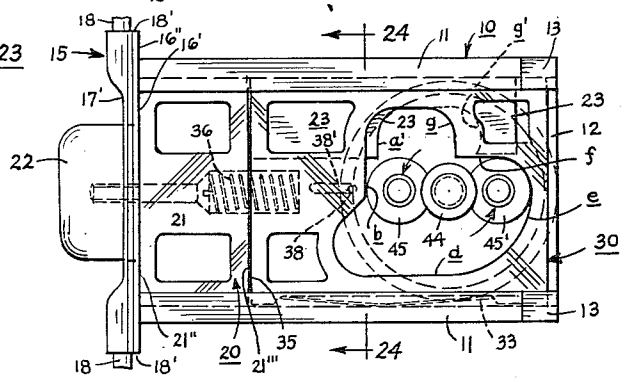


FIG. 24

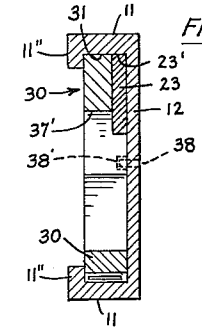
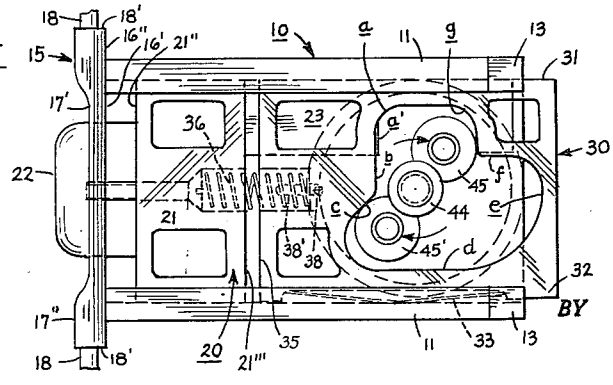


FIG. 25



INVENTORS
PAUL M. DOMSIC
HAROLD J. DIELMAN

BY

Reuben J. Carlson
Attorney

June 25, 1963 P. M. DOMSIC ETAL 3,095,225

AUTOMATIC DOOR LOCKING ASSEMBLIES

Filed Jan. 29, 1962 4 Sheets-Sheet 4

FIG. 26

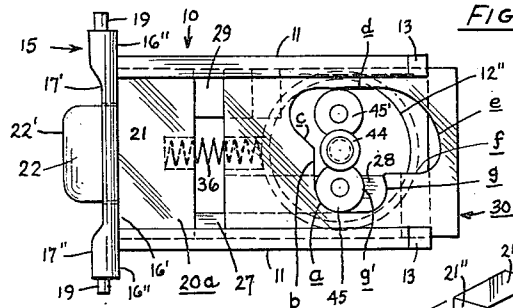


FIG. 27

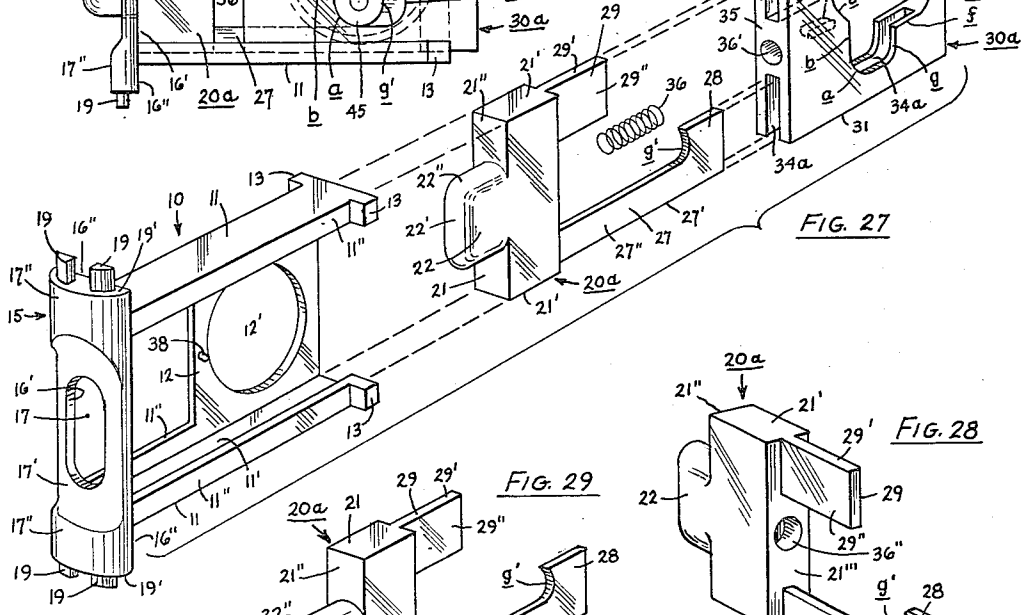


FIG. 28

FIG. 29

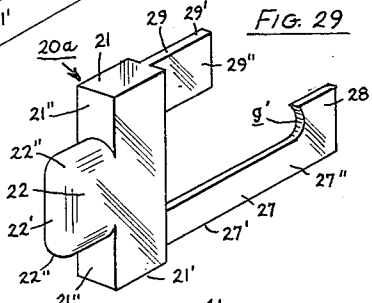
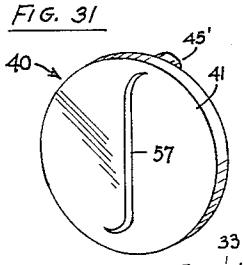


FIG. 31



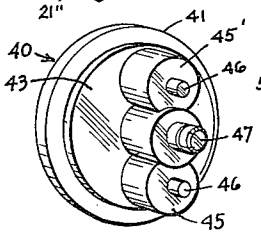


FIG. 32

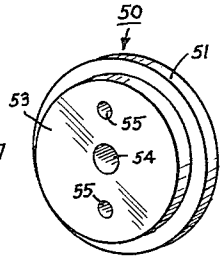


FIG. 33

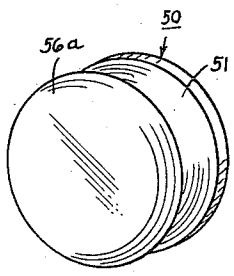


FIG. 30

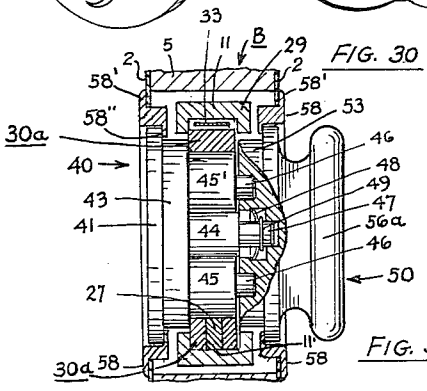


FIG. 34

INVENTORS
PAUL M. DOMSIC
HAROLD J. DIELMAN

BY

Reuben J. Carlson
Attorney

United States Patent Office 3,095,225 Patented June 25, 1963

3,095,225

AUTOMATIC DOOR LOCKING ASSEMBLIES

Paul M. Domsic, Cleveland, and Harold J. Dielman, Lyndhurst, Ohio, assignors to The Sanymetal Products Company, Inc., Cleveland, Ohio, a corporation of Ohio

Filed Jan. 29, 1962, Ser. No. 169,212
15 Claims. (Cl. 292—169)

This invention relates to automatic door locking assemblies, and more particularly to a door locking structure which includes a lock case designed to be inserted and pocketed within a relatively thin door body, and which slidably supports a primary lockbolt slide and an associated secondary slide; and which also includes operative means adapted to manually manipulate the secondary slide in one direction to thereby maintain the lockbolt of the primary slide in rigidly extended door locking position, to manually manipulate the primary slide in the opposite direction to thereby forcibly retract the lockbolt from door locking position, and to automatically return the primary and secondary slides to a neutral position so that the lockbolt of the primary slide returns to its normal resiliently extended position for camming engagement with an adjacent doorframe-supported keeper member when the door is swung to closed position.

This invention embodies important improvements over the door structure and latching assembly disclosed in the Benham Patent 2,876,873, granted March 10, 1959, and which employs a latch case contained within the door body which slidably supports a single latch slide from which the latch bolt extends, and which is slidably manipulated by a cam lug fixed to escutcheon medallions rotatably mounted on the door body. In that latching assembly, the door must be held in fully closed position to thereby align its latch bolt with the latch bolt hole in the keeper plate mounted on the adjacent door frame, before the latch slide can be manually manipulated to project its latch bolt into the latch hole of the doorframe-supported keeper plate. To unlatch the door, the latch slide of that latching assembly is manually manipulated to retract its latchbolt from the latchbolt hole of the doorframe, and is then maintained in retracted position so that the door can again be swung into closed position.

The door locking structure made in accordance with this invention, includes a lock case designed to be inserted within the door body, and which slidably supports a primary slide from which the lockbolt extends, and also slidably supports a secondary slide normally maintained in spaced relation to the primary slide by resilient means, such as a resilient spring. The primary slide includes a slide block whose opposite ends are designed to freely slide within guide channels forming a part of the lock case. The lockbolt is rigidly or integrally secured to the front face of the slide block of the primary slide, and is designed to project through a conforming hole formed in the face plate of the lock case. A cam arm extending rearwardly from the rear face of the slide block of the primary slide, extends into a receiving groove formed in the secondary slide, and terminates in a hook portion presenting a camming edge. An auxiliary guide arm extending rearwardly from the slide block of the primary slide, may also be provided, and which is designed to slide within an appropriate groove formed in the secondary slide. The latchbolt associated with the primary slide is preferably generally rectangular in cross-section, and preferably presents an arcuately crowned end face designed to resiliently cam against the cam face of a doorframe-supported keeper plate when the door is swung into closed position.

The secondary slide may be rectangular in form, and presents upper and lower faces designed to slide in the guide channels of the lock case. A resilient spring is

positioned between the front face of the secondary slide and the rear face of the slide block of the primary slide, and may be supported by spring receiving pockets or holes formed therein. The secondary slide has a camming hole extending therethrough which presents an internal camming rim of particular shape and contour, and which at least in part exposes the camming edge presented by the cam arm of the primary slide.

A camming element extends into the camming hole of the secondary slide, and is designed to engage the camming rim of the secondary slide as well as the camming rim of the cam arm of the primary slide. The camming element may be made in the form of a pair of diametrically opposed camming trunnions fixed to a pair of circular escutcheon medallions which are rotatably supported in circular seating rims presented by the side faces of the door body. By appropriate clockwise and counterclockwise rotative movement of a handle bar or knob extending from one or both escutcheon medallions, the camming trunnions may be rotated clockwise or counterclockwise into camming engagement with particular rim portions of the camming hole in the secondary slide, and into camming engagement with the camming rim of the cam arm extending from the primary slide.

When the door is open, the camming trunnions are maintained in neutral position by expansion of the resilient spring, and the expanded spring then projects the lockbolt of the primary slide into resiliently extended position, and in a position to resiliently cam against the cam face of a doorframe-supported keeper plate when the door is swung to closed position. To lock the closed door, the handle bar or knob and associated camming element or camming trunnions are rotated in one direction for a distance of approximately ninety degrees from neutral position, to thereby advance the secondary slide in a position closely adjacent the slide block of the primary slide, with resultant compression of the resilient spring, which thereupon maintains the lockbolt of the primary slide in rigidly extended locking position. To unlock the door, the handle bar or knob and associated camming element or camming trunnions, are rotated in the opposite direction from locking position to neutral position, and thence further rotated in said opposite direction for an additional forty-five degrees, whereupon the camming element engages and drives the cam arm and associated primary slide in a rearward direction, to thereby forcibly retract the lockbolt from locking position and simultaneously compress the resilient spring to a sufficient extent to permit opening movement of the door. When the handle bar is released, the camming trunnions are automatically swung to neutral position by expansion of the resilient spring, and the expanding spring also drives the primary slide in an outward direction to project its lockbolt into resiliently extended position, and in position for camming engagement with the cam face of the doorframe-supported keeper plate when the door is again swung to closed position.

The automatic door locking structure of this invention is particularly designed for association with a reversible doorframe-supported keeper plate, which presents a lockbolt receiving hole whose vertical axis is designed to be located on the center line of the jamb face of the doorframe. The keeper plate presents a camming face on one side of its lockbolt receiving hole, and a laterally projecting door stop face on the other side of the lockbolt receiving hole, and against which the lockbolt is designed to abut when the door is closed. By making the keeper plate and associated door stop in a manner to permit reversible mounting thereof on the supporting door frame, the door body may be mounted in the field to swing either inwardly or outwardly, since the lockbolt and door locking structure of this invention are designed to cooperatively interlock with the keeper plate mounted

to present its door stop at either the left hand or right hand side of the doorframe.

Automatic door locking assemblies may be made in accordance with this invention from relatively few parts, and can be manufactured and installed at relatively low cost. The lock case, primary slide, and secondary slide of the door locking structure, may each be integrally cast or molded from metal or plastic materials. The locking structure of this invention may be assembled as a unit for insertion into a receiving pocket formed in door bodies made of wood, or hollow metal, or other materials. The face plate of the latch case is designed for rigid attachment to the jamb face of the door body to support the latch case in cantilever suspension, and the face plate may be contoured in streamlined symmetry with the jamb edge of the door body.

The keeper plate and associated door stop element may be cast or molded as an integral unit, or made in two parts, and can be formed of minimum material at low cost. The keeper plate and door stop structure may be designed for attachment to the jamb edge of either wood or hollow metal doorframes in contour symmetry with the jamb edge of the doorframe, and without overlapping the side faces of the doorframe. The face plate of the door-supported locking structure may present a depressed area around its lockbolt hole, to receive the projecting doorstop element of the keeper structure, and its doorstop element need project no more than one-quarter inch from the opposite cam face of the keeper plate, so that the jamb faces of the door body extending above and below the lockbolt, and the jamb faces of the doorframe extending above and below the doorstop element and keeper plate, may be placed in closely adjacent relation with minimal clearance therebetween, when the door and doorframe are erected in the field.

Other objects and advantages of this invention will become apparent as the disclosure proceeds.

Although the characteristic features of this invention will be particularly pointed out in the claims, the invention itself, and the manner in which it may be made and used, may be better understood by referring to the following description taken in connection with the accompanying drawings forming a part hereof in which:

FIG. 1 is an elevational view of a typical form of swingably mounted door and adjacent doorframe post having the door locking assembly of this invention in mounted association therewith;

FIG. 2 is a fragmentary elevational view of the locking edge of the door and the exposed edge face of the door locking structure in mounted association therewith, and as the same would appear when viewed along line 2—2 of FIG. 1;

FIG. 3 is a fragmentary elevational view of the locking edge of the doorframe-forming post, and the reversible keeper plate and doorstop structure mounted thereon, and which is designed to cooperate with the door mounted locking structure, this view being taken along line 3—3 of FIG. 1;

FIG. 4 is a fragmentary horizontal section of the door, adjacent doorframe forming posts, and associated door locking structure and keeper plate and doorstop structure, as the same would appear when viewed along line 4—4 of FIG. 1;

FIG. 5 is a fragmentary transverse section of the door body supported locking structure and the doorframe supported keeper structure, and which illustrates the relative position of the primary and secondary slides when the lockbolt of the primary slide is in resiliently extended neutral position, and about to move into resilient camming engagement with the cam face of the pilaster mounted keeper plate during initial closing movement of the door;

FIG. 6 is another fragmentary transverse section of the door body-supported locking structure and doorframe-supported keeper structure, and which illustrates the relative position of the primary and secondary slides and the resiliently retracted position of the lockbolt, as the same would appear as the lockbolt moves across the camming face of the keeper plate during final closing movement of the door;

FIG. 7 is a further fragmentary transverse section of the door body-supported locking structure and doorframe-supported keeper structure, and which illustrates the relative position of the primary and secondary slides and the rigidly extended position of the lockbolt when interlocked with the keeper structure;

FIG. 8 is a further fragmentary transverse section of the door body-supported locking structure and the doorframe-supported keeper structure, and which illustrates the relative position of the primary and secondary slides and the retracted position of the lockbolt when disengaged from the keeper structure, so that the door can be swung to open position;

FIG. 9 is an elevational view of the locking structure as it appears prior to application of the secondary escutcheon medallion to the axial trunnion and camming trunnions which extend from the primary escutcheon medallion;

FIG. 10 is a perspective view illustrating the lock case, the primary slide and the secondary slide components of the locking structure in exploded relation;

FIG. 11 is a perspective view of the several components which form the primary slide, shown in exploded relation;

FIG. 12 is another perspective view of one component of the primary slide which illustrates further structural details thereof;

FIG. 13 is a perspective view of the rear face of the primary escutcheon medallion, and showing the camming trunnions and axial trunnion extending from the inside face thereof;

FIG. 14 is a perspective view of the outer face of the primary escutcheon medallion shown in FIG. 13;

FIG. 15 is a perspective view of the rear face of the secondary escutcheon medallion, and showing the holes formed on the inner face thereof which are designed to receive the insert studs extending from the trunnions of the primary escutcheon medallion when the paired escutcheon medallions and associated camming trunnions are assembled to the door body in operative relation with the primary and secondary slides;

FIG. 16 is a perspective view of the outer face of the secondary escutcheon medallion shown in FIG. 15, and showing a handle bar formed on the outer face thereof;

FIG. 17 is a fragmentary perspective view of the camming trunnions and axial trunnion associated with the primary escutcheon medallion shown in FIG. 13, this view showing a resiliently fingered locking washer applied to the projecting stud of the axial trunnion, and which is designed to interlock with the axial hole formed in the inner face of the secondary escutcheon medallion shown in FIG. 15 when the paired escutcheon medallions are assembled to the door body;

FIG. 18 is a fragmentary vertical section of the door mounted locking structure as the same would appear when viewed along line 18—18 of FIG. 1, this view showing in further detail the manner in which the circular escutcheon medallions may be rotatably mounted on the door body, the manner in which the escutcheon medallions are interlocked together in operative relation, and the position of the camming trunnions in relation to cam rim portions of the primary and secondary slides when the camming trunnions are in neutral position;

FIG. 19 is an elevational view of the locking structure as it appears when the secondary escutcheon medallion is removed, and which illustrates the relative position of the camming trunnions and primary and secondary slides when in neutral position and when the lockbolt of the primary slide is resiliently extended as indicated in FIG. 5;

FIG. 20 is an end view of the locking structure as viewed in the direction of the arrows 20—20 of FIG. 19;

FIG. 21 is another elevational view of the locking structure as it appears when the secondary escutcheon medallion is removed, this view illustrating the relative position of the primary and secondary slides when the lockbolt of the primary slide has been depressed by camming engagement with the cam face of the keeper plate as indicated in FIG. 6, without movement of the camming trunnions from neutral position;

FIG. 22 is a transverse section of the locking structure as viewed along line 22—22 of FIG. 21, and as the same would appear prior to application of the secondary escutcheon medallion to the trunnions of the primary escutcheon medallion;

FIG. 23 is an elevational view of the locking structure as the same would appear when the secondary escutcheon medallion is removed, this view showing the position of the camming trunnions when rotated counterclockwise through an angle of approximately ninety degrees from neutral position, and to thereby advance the secondary slide substantially in abutting relation against the rear face of the slide block of the primary slide and thereby maintain the lockbolt of the primary slide in rigidly projected locking position as indicated in FIG. 7;

FIG. 24 is a vertical section of the locking structure as viewed along line 24—24 of FIG. 23;

FIG. 25 is an elevational view of the locking structure as the same appears when the secondary escutcheon medallion is removed, this view showing the position of the camming trunnions after they have been rotated clockwise through a distance of approximately forty-five degrees from neutral position, and to thereby engage the cam arm of the primary slide and move both the primary and secondary slides rearwardly to forcibly retract the lockbolt of the primary slide from door locking position as indicated in FIG. 8;

FIG. 26 is an elevational view of a modified form of locking structure made in accordance with this invention, and as it would appear prior to application of the secondary escutcheon medallion to the trunnions of the primary escutcheon medallion;

FIG. 27 is a perspective view illustrating the latch case, the primary slide and the secondary slide components of the modified locking structure shown in FIG. 26, and shown in exploded relation;

FIG. 28 is a perspective view of the primary latch slide of the modified locking structure shown in FIGS. 26 and 27;

FIG. 29 is another perspective view of the modified primary slide as shown in FIG. 28 and illustrating further structural details thereof;

FIG. 30 is a perspective view of the rear face of the primary escutcheon medallion designed for association with the modified locking structure shown in FIG. 26, this view showing the axial trunnion and associated diametrically opposed camming trunnions extending from the rear face thereof;

FIG. 31 is a perspective view of the outer face of the primary escutcheon medallion shown in FIG. 30;

FIG. 32 is a perspective view of the rear face of the secondary escutcheon medallion, and showing the holes formed in the rear face thereof which are designed to receive the insert studs extending from the trunnions of the primary escutcheon medallion shown in FIG. 30, when the paired escutcheon medallions and associated trunnions are assembled to the door body in operative association with the primary and secondary slides;

FIG. 33 is an exterior view of the secondary escutcheon medallion shown in FIG. 32 and which presents a handle knob on the outer face thereof; and

FIG. 34 is a fragmentary vertical section of the modified locking structure whose circular escutcheon medallions are rotatably mounted on circular seating rims presented by the side faces of the door body, this view showing in further detail the manner in which the escutcheon medallions are interlocked together in operative relation,

and the relative position of the camming trunnions and the cam edge portions of the primary and secondary slides when the camming trunnions are in neutral position.

Similar reference characters refer to similar parts throughout the several views of the drawings and the specification.

The door locking assembly of this invention comprises a door locking structure A designed for attachment to the jamb edge of a door body B, and which is particularly designed for interlocking engagement with a keeper structure C mounted on the jamb edge of an adjacent doorframe forming post or pilaster D, as shown in FIGS. 1–8. The door locking structure A is particularly designed for association with relatively thin doors made from sheet metal, sheeted plastics, wood or other composition materials, and which is formed to provide a pocket which receives the case section of a lock case **10**. The lock case **10** represents a face plate **15** designed to be secured to the jamb edge of the door body, and a case section which is designed to contain and slidably support a primary slide **20** and a secondary slide **30**. The primary slide **20** has a lockbolt **22** which projects through a lockbolt hole **17** in the face plate **15** of the lock case **10**. The lockbolt **22** is normally maintained in rigidly extended position by resilient means, such as a helical spring **36** positioned between the primary slide **20** and secondary slide **30**. A camming element, which may be in the form of a pair of diametrically opposed camming trunnions **45** and **45'**, extends through a camming hole **37** in the secondary slide **30**, and is rotatably mounted on the door body for rotation in opposite directions from a neutral position. Rotation of the camming trunnions **45** and **45'** in one direction from neutral position, moves the secondary slide in a forward direction to maintain the lockbolt **22** in rigidly extended position, and rotation of the camming trunnions **45** and **45'** in the opposite direction from neutral position operates to retract the lockbolt **22** to door-opening retracted position. When the camming trunnions **45** and **45'** are manually released from lockbolt retracted position, the camming trunnions automatically return to neutral position and the lockbolt **22** returns to resiliently extended position, under the influence of the resilient spring **36**.

The locking structure A is particularly designed for cooperation with a keeper structure C made in accordance with this invention, and which is mounted on the jamb edge of the adjacent doorframe-forming post or pilaster D, as shown in FIGS. 1 and 3 to 8 inclusive. The keeper structure C presents a body section **100** having a lockbolt receiving hole **101** therein, an inclined cam face **102** on one side of the lockbolt hole **101**, and a door stop element **103** on the other side of the lockbolt hole **101**. The lockbolt **22** of the locking structure A is designed to abut the door stop element **103** when the door is in closed position, and when the lockbolt **22** is extended in the position as shown in FIG. 7, or in retracted position as shown in FIG. 8. The keeper structure **100** is designed to be reversibly mounted on the jamb edge of the doorframe-forming post or pilaster D, so that the door can be mounted to swing either inwardly or outwardly. This keeper structure is designed to be confined within the jamb edge and between the side faces of relatively thin doorframe-forming posts or pilasters, made from either metallic or plastic sheet materials, wood or other composition materials.

In this door locking assembly, the lockbolt **22** of the door locking structure A not only provides the means for locking the door in closed position, but also operates to maintain the door in closed position when not locked, and also provides abutment means which cooperates with the doorstop element of the keeper structure to limit the swinging movement of the door. The face plate **15** of the door locking structure may present a depressed area or cavity **17'** in surrounding relation to the lockbolt hole **17**, which provides clearance for the projecting door stop

element 103 of the keeper structure, and so that the adjacent jamb edges of the door body and doorframe-forming post or pilaster present only minimal door swinging clearance therebetween.

As shown more particularly in FIGS. 9 and 10, the lock case 10 of the door locking structure A presents a pair of spaced and parallel guide channels 11 each having a smooth interior web face 11' defined between a pair of guide ribs 11''. A reinforcing side wall 12 joins adjacent guide ribs 11'' of the spaced guide channels 11, and has a circular window 12' therein through which the camming trunnions 45—45' and a part of the associated circular escutcheon medallion 40 project. The spaced guide channels 11—11 are rigidly secured at one end thereof to the rear face of a facing plate 15 and are supported in cantilever suspension therefrom. The inner ends of the spaced guide channels 11—11 may be provided with laterally projecting bosses 13 designed to brace against the inner surfaces of the lock case receiving pocket 9 provided in the door body as shown in FIG. 4. The lock case 10 may be integrally cast from a suitable metal such as steel, aluminum or brass, or molded from a tough, strong and wear-resistant plastic compound.

The primary slide 20, as shown in FIGS. 10, 11 and 12, comprises a slide block section 21 which supports a lockbolt 22 extending forwardly therefrom and a cam arm 23 extending rearwardly therefrom. The slide block section 21 may be generally rectangular in form, and presents smooth end faces 21' designed to smoothly reciprocate within the spaced guide channels 11—11 of the lock case 10 and in sliding contact with the web faces 11'—11' thereof, and is guided in its reciprocating movement by the smooth inner surfaces of the guide ribs 11''—11'' of the guide channels 11—11. The lockbolt 22 is rigidly or integrally secured to the front face 21'' of the slide block 21 and is designed to project through the conforming hole 17 provided in the face plate 15 of the lock case 10. The cam arm 23 rigidly projects from the rear face 21''' of the slide block 21 of the primary slide, and presents a smooth upper edge 23' which forms a continuation of the adjacent end face 21' of the slide block 21. The cam arm 23 also presents a lower edge 23'' which is interrupted by a generally U-shaped cam slot 24 which defines a camming rim 24' designed to be engaged by one of the camming trunnions 45 associated with the rotatably mounted escutcheon medallions 40 and 50.

The lockbolt 22 is preferably rectangular in cross-section and presents an arcuately contoured end face 22' and arcuately contoured top and bottom faces 22''. Its arcuately contoured end face 22' is designed to cam against the cam face 102 of an adjacent doorframe-supported keeper structure C and to abut against a door stop element 103 associated therewith when the door is closed. The lockbolt 22 of the primary slide 20 is preferably formed from a strong and wear-resistant plastic compound; and the entire primary slide 20, including the lockbolt 22, slide block 21 and cam arm 23 may be integrally molded in one piece from a strong and wear-resistant plastic compound. However, the slide block 21 and cam arm 23 extending therefrom may be integrally cast from a suitable metal such as steel, aluminum or brass, and suitable means provided for rigidly securing the molded lockbolt 22 to the front face 21'' of the metallic slide block 21. As shown in FIGS. 11 and 12, such securing means may comprise a threaded screw 25 inserted through a conforming hole 25' in the slide block and which is threaded into a threaded hole 25'' formed in the rear face of the molded lockbolt 22. A pair of aligning pins 26 fixed to and projecting from the front face 21'' of the primary slide 20, and symmetrically spaced with respect to the screw receiving hole 25' in the slide block 21, are designed to project into symmetrically spaced receiving holes 26' formed in the rear face of the lockbolt 22. The projecting pins 26 serve to maintain the lockbolt 22 in proper alignment when the lockbolt is secured to the slide block 21 by the securing screw 25. The weight of the primary slide 20 may be materially reduced by forming windows or pockets 20*x* in the cast or molded slide block 21 thereof.

The secondary slide 30 operates in conjunction with the camming trunnions 45—45' to manipulate and control the movement of the primary slide 20 and its associated lockbolt 22. The secondary slide 30 is generally rectangular in form, and may be cast or molded as an integral unit from a suitable metal or a strong and wear-resistant plastic compound. The secondary slide 30 presents a smooth horizontal slide face 31 at the upper horizontal edge thereof, and a pair of spaced shoes 32 at the lower horizontal edge thereof which present smooth shoe faces 32' designed to slide along the smooth web face 11' of the lower guide channel 11 of the lock case 10, and in guided relation to the inner faces of the guide ribs 11'' thereof. The upper horizontal slide face 31 is designed to smoothly slide along the smooth web face 11' of the upper guide channel 11 of the lock case 10, and is maintained in non-vibratory sliding contact therewith by an angular leaf spring 33 which is set between the spaced slide shoes 32 of the secondary slide. The ends 33' of the angular leaf spring 33 are placed in gripping abutment against the inner faces of the spaced slide shoes, to thereby maintain the crown portion 33'' of the leaf spring in resilient sliding contact with the web face 11'' of the lower guide channel 11 of the lock case.

A cam arm receiving groove 34 is formed in one of the side faces of the secondary slide 30 as shown in FIG. 10, and which presents a horizontally extending ledge portion 34' along which the lower horizontal edge 23'' of the cam arm 23 of the primary slide 20 is slidably guided. The groove 34 also presents an inset side face 34'' along which the adjacent side face of the cam arm 23 is slidably guided. When the primary slide 20 and secondary slide 30 are assembled together, the upper horizontal slide face 31 of the secondary slide is substantially in flush alignment with the upper horizontal edge 23' of the cam arm 23 of the primary slide, and the angular leaf spring 33 operates to maintain both of the adjacent horizontal slide faces 23' and 31 in sliding contact with the smooth web face 11' of the upper guide channel 11 of the lock case, and in guiding contact with the inner faces of the guide ribs 11'' thereof.

The secondary slide 30 presents a flat front face 35 in shape conformity with the rear face 21''' of the slide block 21 of the primary slide 20. The rear face 21''' of the slide block 21 of the primary slide 20 and the front face 35 of the secondary slide 30 are normally maintained in spaced relation by resilient means, such as a helical spring 36 as shown in FIGS. 9 and 11. The helical spring 36 may be supported by inserting one end thereof into a bored hole 36' formed in the front face 35 of the secondary slide 30, and by inserting the other end thereof into a corresponding bored hole 36'' formed in the rear face 21''' of the slide block 21 of the primary slide 20. The helical spring 36 serves to effectuate a predetermined manipulation of the primary slide 20 and its associated lockbolt 22, when the secondary slide 30 is manipulated in a predetermined manner by rotation of the camming trunnions 45—45' associated with the escutcheon medallions 40 and 50.

Manipulation of the secondary slide 30 is effected by the provision of a camming hole 37 extending through the body of the secondary slide and which presents a camming rim 37' of particular configuration as shown in FIG. 10, and which may be divided into seven cam rim portions which are designated for purpose of convenience as cam rim portions *a*, *b*, *c*, *d*, *e*, *f* and *g* as shown in FIGS. 19, 21, 23 and 25. The cam rim portions *a*, *b*, *c*, *d*, *e*, *f* and *g* are designed to be engaged by the camming trunnnions 45 or 45' when the rotatably mounted escutcheon medallions 40 and 50 are rotated in a particular manner, as hereafter described. The secondary slide 30 may be cast or molded as an integral unit from a suit-

able metal or plastic compound, and its weight may be reduced by forming windows or pockets 30x therein.

The lock case 10, primary slide 20 and secondary slide 30, along with the associated leaf spring 33 and helical spring 36, can be economically manufactured and quickly assembled together at the factory. In assembling these components, the primary slide 20 is inserted into the latch case through the rear end thereof, and the lockbolt 22 projected through the lockbolt receiving hole 17 in the face plate 15 of the latch case. The leaf spring 33 is applied to the secondary slide 30, and the resilient spring 36 is mounted between the primary and secondary slides when the secondary slide 30 is inserted into the latch case. These components may be maintained in assembled relation during shipment and handling by the provision of a set screw 38, threaded into the side wall 12 of the lock case 10 as shown in FIGS. 10, 23 and 24. The rounded end of the set screw 38 is designed to project into a closed end abutment slot 38' formed in the adjacent side wall of the secondary slide 30. The set screw 38 and cooperating closed end slot 38' permit unobstructed but limited sliding movement of the secondary slide 30 within the latch case, but prevents undesired withdrawal of the secondary slide 30 from the rear end of the lock case 10 when the components are assembled together.

The camming trunnions 45 and 45' may be formed as an integral part of the primary escutcheon medallion 40 as shown in FIGS. 13, 14 and 17. The primary escutcheon medallion 40 presents a circular outer section 41 whose circular rim is designed to be rotatably supported within a circular seating rim 42, which may be formed in the side wall of the door body as shown in FIG. 18, to present a circular rim wall 42' terminating in an inturned lip 42'' which provides a supporting seat for the rear face of the disc section 41. The circular seating rim 42 may be so formed that the exposed face of the outer section 41 of the escutcheon medallion is substantially flush with the adjacent wall-forming face of the door body. A circular inner section 43, of smaller diameter than the outer section 41 and secured to the inner face thereof, is designed to extend through the circular hole defined by the seating lip 42'' of the circular supporting rim 42 of the door body and into the circular window 12' of the latch case 10.

An axial trunnion 44 extends from the rear face of the inner circular section 43 of the medallion 40. The diametrically opposed camming trunnions 45 and 45' also extend from the rear face of the inner circular section 43 of the medallion 40, and each presents a semi-cylindrical body surface designed to cam against the camming rim 37' of the secondary slide 30. A cylindrical bearing stud 46 of reduced diameter extends from the inner end of each of the camming trunnions 45 and 45' as shown more particularly in FIGS. 13, 17 and 18. An elongated shaft forming stud 47 provides a reduced diameter axial extension of the axial trunnion 44. The shaft forming stud 47 has a peripheral groove therein which receives an expansion washer 48 which is locked within the groove by means of a split ring 49. The expansion washer 48 presents radially extending spring fingers 48' designed to secure the secondary escutcheon medallion 50 to the axial stud 47.

The secondary escutcheon medallion 50, as shown in FIGS. 15, 16 and 18, presents an outer circular section 51 designed to be rotatably supported by a circular seating rim 52 which may be formed in or otherwise presented by the adjacent face of the door body. This seating rim 52 presents a circular rim wall 52' within which the outer disc section 51 rotates, and an inturned seating lip 52'' which provides a seat for the rear face of the outer disc section 51. An inner disc section 53 projects from the inner face of the outer disc section 51, and is reduced in diameter so as to extend through the hole defined by the seating lip 52'' of the seating rim 52. An axial hole 54 is formed in the inner disc section 53 and is of sufficient depth to receive the axial stud 47 projecting from the axial trunnion 44 of the escutcheon medallion 40. The interior cylindrical surface of the axial hole 54 is slightly greater in diameter than the diameter of the axial stud 47, and presents a rough interior surface or ledge designed to grip the resilient radial fingers 48' of the expansion washer 48. The inner face of the inner disc section 53 of the escutcheon medallion 50 also presents diametrically opposed holes 55 designed to receive the studs 46 projecting from the camming trunnions 45 and 45' associated with the primary escutcheon medallion 40.

The outer disc 41 of the secondary escutcheon medallion 50 is provided with a handle knob or bar 56 as shown in FIGS. 16 and 17 and which may be cast integral therewith. The handle bar 56 may be advantageously shaped as shown in FIG. 16, to present recessed grooves 56' along the sides thereof so that it can be gripped by the fingers without damage to fingernails. A similar handle bar may also be formed on the outer disc section 41 of the primary escutcheon medallion 40, or alternatively, the handle bar 56 may be applied to the outer disc section 41 of the primary escutcheon medallion 40 only. Where only one of the outer disc sections 51 or 41 is provided with a handle bar 56, the exposed flat face of the other outer disc section may be advantageously provided with a slot 57 as shown in FIG. 14, into which the edge of a coin or other tool may be inserted, and by means of which the escutcheon medallions may be rotated to unlock the door in case of emergency.

The outer escutcheon medallion 40, comprising the outer disc section 41, the inner disc section 43, the axial trunnion 44 and its projecting stud 47, as well as the diametrically opposed camming trunnions 45 and 45' and their axial studs 46, may be made as a one-piece casting at relatively low cost, and its exposed outer surfaces plated with bright metal. The secondary escutcheon medallion 50, including its outer disc section 51, its inner disc section 53 and its handle bar 56, may also be integrally made as a one-piece casting, and its exposed surfaces plated with a bright metal.

The door locking structure A of this invention is mounted on the door body by inserting the guide channels 11 of the lock case 10, with the primary slide 20 and secondary slide 30 previously mounted therein, into a receiving pocket formed in the door body. The face plate 15 of the lock case 10 is then suitably secured to the jamb edge of the door body so that the lock case is thereby supported in cantilever suspension. The axial trunnion 44 and camming trunnions 45 and 45' of the primary escutcheon medallion 40 are then inserted through the seating rim 42 of the door body, through the window 12' in the side wall 12 of the lock case 10, and into the camming hole 37 of the secondary slide 30. In the same insertion operation, the outer disc section 41 of the escutcheon medallion 40 is placed in rotatably seated position on the seating rim 42 of the door body.

The secondary escutcheon medallion 50 is then applied to the opposite face of the door body, with its outer disc section 51 rotatably positioned within the seating rim 52 of the door body. Inward pressure is then exerted on both escutcheon medallions 40 and 50 to thereby drive the resilient fingers 48' of the expansion washer 48 into the axial receiving hole 54 of the secondary escutcheon medallion 50, and simultaneously effecting insertion of the studs 46 projecting from the camming trunnions 45 and 45' into the receiving holes 55 of the companion escutcheon medallion 50, as shown in FIG. 18. When the expansion washer 48 is pressure driven into the axial hole 54 of the companion escutcheon medallion 50, the resilient fingers 48' of the expansion washer 48 are sprung into conical form by contact with the inner wall of the axial hole 54, and frictionally inter-

lock therewith in a manner which prevents outward removal of the companion escutcheon medallion **50**.

When the escutcheon medallions **40** and **50** have thus been mounted in operative position on the door body, and in operative association with the primary and secondary slides **20** and **30**, the camming trunnions **45** and **45'** may be rotatably manipulated to and from neutral position, to and from locking position, and to and from unlocking position, by a proper rotation of the escutcheon medallions **40** and **50** by means of the handle bar **56**.

When the handle bar **56** is in neutral position, the lockbolt **22** of the primary slide **20** is maintained in resiliently extended position, as shown in FIGS. 5 and 19, by expansion of the helical spring **36**. In neutral position, the camming trunnion **45** is approximately at the twelve o'clock position, and has bearing contact with the curvilinear rimmed portion *a* of the camming rim **37'** of the secondary slide **30** as shown in FIG. 19, while the opposite camming trunnion **45'** is at the six o'clock position and is in camming contact with the straight edge portion *d* of the camming rim **37'** of the secondary slide. In this neutral position, the helical spring **36** expands to drive the front face **21''** of the primary slide **20** into abutment against the inside face **16'** of the face plate **15** of the lock case **20**, and resiliently maintains the lockbolt **22** in maximum projecting position. It will also be noted that when the camming trunnion **45** is in neutral position as shown in FIG. 19, it is clamped between the cam rim portion *a* of the secondary slide **30** and the cam rim portion *g'* of the cam arm **24** of the primary slide **20** by the expansion action of the helical spring **36**, and the camming trunnions **45** and **45'** are thereby held in neutral position. The handle bar **56** is preferably positioned in substantial alignment with the opposite camming trunnions **45** and **45'**, so that the handle bar **56** extends vertically when the camming trunnions are in neutral position.

When inward pressure is exerted against the arcuate end face **22'** of the lockbolt **22**, as indicated in FIGS. 6 and 21, the opposite camming trunnions **45** and **45'** remain in neutral position, but the expanded helical spring **36** is compressed between the front face **35** of the secondary slide **30** and the rear face **21'''** of the slide block **21** of the primary slide **20**. Inward compression is exerted on the lockbolt as it cams against the camming surface **102** of the doorframe-supporting keeper plate C, and during closing movement of the door as illustrated in FIG. 6. When the door is fully closed, the compressed lockbolt **22** is automatically projected into the lockbolt hole **101** in the doorframe-supporting keeper plate by expansion of the compression spring **36**, and while the camming trunnions **45—45'** remain in the neutral position as shown in FIG. 19. The compressive travel of the lockbolt **22** is however, limited by the cam rim portion *a'* of the cam slot **24** in the cam arm **23** of the primary slide **20**, which moves into abutment against the neutrally positioned camming trunnion **45** as shown in FIG. 21.

After the lockbolt **22** has been resiliently projected into the lockbolt hole **101** of the doorframe-supporting keeper plate C, the lockbolt **22** may be locked in projected position by rotating the camming trunnions **45** and **45'** in a counterclockwise direction for a distance of approximately ninety degrees from neutral position, as indicated in FIG. 23. When rotated from neutral to locking position, the camming trunnion **45** moved counter-clockwise from the neutral twelve o'clock position to the nine o'clock position, and into camming engagement with the relatively straight cam rim portion *b* of the secondary slide **30**, thereby advancing the front face **35** of the secondary slide substantially into abutment against the rear face **21'''** of the slide block **21** of the primary slide, with resultant compression of the helical spring **36** which thereupon maintains the front face **21''** of the primary slide block **21** in abutment against the rear face **16'** of the facing plate **15**, and the lockbolt **22** in rigidly projected position. During movement from neutral to locking position, the camming trunnion **45'** moves from its six o'clock neutral position to the three o'clock locking position, and into engagement with the cam rim portion *e* and into abutting contact with the limit-stop cam rim portion *f* of the secondary slide **30**, and which thereupon prevents further counter-clockwise rotation of the camming trunnions **45** and **45'**, as shown in FIG. 23.

When the lockbolt **22** is in rigidly extended locking position as shown in FIG. 23, the camming trunnions **45** and **45'** are maintained in locking position by the compressed helical spring **36**, which maintains the cam rim portion *b* of the secondary slide **30** in pressure contact with the camming trunnion **45**, so that the door can only be unlocked by a manually applied clockwise rotation of the escutcheon medallions **40** and **50** from locking position to neutral position. When the camming trunnions **45** and **45'** are rotated in a clockwise direction from locking position as shown in FIG. 23 to the neutral position as shown in FIG. 19, expansion of the helical spring **36** moves the secondary slide **30** rearwardly to the position shown in FIG. 19, and the expanded spring **36** then maintains the lockbolt **22** in resiliently extended position and within the lockbolt hole **101** of the doorframe-supported keeper structure C.

To retract the lockbolt **22** from its inserted position within the lockbolt hole **101** of the doorframe-supported keeper structure C, the camming trunnions **45** and **45'** are manually rotated, from the neutral position as shown in FIG. 19, in a clockwise direction for approximately forty-five degrees, as shown in FIG. 25. During this clockwise rotation, the camming trunnion **45** cams against the cam edge *g'* of the cam arm **23** of the primary slide **20** as shown in FIGS. 19 and 25 and draws the cam arm **23** rearwardly, to thereby forcibly retract the lockbolt **22** associated with the primary slide, so that its arcuate end face **22'** will be fully withdrawn from the lockbolt hole **101** of the doorframe-supported keeper structure C as shown in FIG. 8, and permitting opening movement of the door. When the camming trunnion **45** has been rotated to door unlocking position as shown in FIG. 25, further clockwise rotation thereof is prevented by the companion camming trunnion **45'** which then abuts the cam rim portion *c* of the secondary slide **30**. Thus, the lockbolt **22** can be withdrawn to retracted position only by manual clockwise rotation of the handle bar **56**. The handle bar **56** is manually held in unlocking position until the door is opened, and when the handle bar **56** is then released, expansion of the resilient spring **36** automatically returns the camming trunnions **45—45'** from unlocked position as shown in FIG. 25 to neutral position as shown in FIG. 19.

The modified door locking assembly as shown in FIGS. 26–34 has the same operating characteristics as the locking assembly shown in FIGS. 9–25 and previously described. The lock case **10** associated with the modified locking assembly as shown in FIGS. 26 and 27, may be similar to the lock case **10** as shown in FIGS. 9 and 10, and presents a pair of spaced and parallel extending guide channels **11—11** secured to the rear face **16'** of the face plate **15** and reinforced by a side wall **12** which is joined to adjacent guide ribs **11''—11''** of the spaced guide channels **11—11**. The reinforcing side wall **12** has a circular window opening **12'** therein through which the camming trunnions **45** and **45'** and axial trunnions **44** of the primary escutcheon medallion **40** extend. The face plate **15** of the lock case **10** is also provided with a lockbolt receiving hole **17** through which the lockbolt **22** of the modified primary slide **20***a* is designed to project.

The modified primary slide **20***a* as shown in FIGS. 27, 28 and 29, is preferably integrally molded from a strong and wear-resistant plastic compound, and presents a slide block **21** having a lockbolt **22** projecting from the front face **21''** thereof, and a cam arm **27** and a guide arm

29 projecting medially from the rear face 21''' thereof. The slide block 21 of the primary slide 20*a* presents smooth end faces 21' designed to slidably reciprocate within the guide channels 11—11 of the lock case 10, and in guided relation to the web face 11' and guide ribs 11'' thereof. The cam arm 27 presents a horizontal slide edge 27' designed to slide along the web face 11' of the lower guide channel 11 of the lock case 10, with its smooth side faces 27'' designed to slide within a groove 34*a* extending into the modified secondary slide 30*a*. The cam arm 27 terminates in a hook portion 28 which presents a cam edge *g'* designed to be engaged by the camming trunnion 45 associated with the escutcheon medallions 40 and 50. The guide arm 29 presents a horizontal edge 29' which forms a continuation of the adjacent end face 21' of the slide block 21, and smooth side faces 29'' designed to smoothly slide within a guide groove 39 formed in the modified secondary slide 30*a*.

The modified secondary slide 30*a* may be integrally cast or molded from a suitable metal or a strong and wear-resistant plastic compound. The secondary slide 30*a*, as shown in FIG. 27, presents spaced slide shoes 32 along the upper edge thereof which presents smooth shoe faces 32' designed to slidably reciprocate within the upper guide channel 11 of the lock case 10. The ends 33' of an angularly shaped leaf spring 33 are inserted between the spaced slide shoes 32, and its crown portion 33'' is designed to slide along the web face 11' of the upper guide channel 11 of the lock case. The lower horizontal edge 31 of the secondary slide 30*a* is designed to slide along the web face 11' and in guided relation with the guide ribs 11'' of the lower guide channel 11 of the latch case. The angular leaf spring 33 insures smooth and non-vibratory sliding movement of the secondary latch slide 30*a* within the lock case.

The secondary slide 30*a* has a cam arm receiving groove 34*a* extending along the lower horizontal edge 31 thereof and which is designed to slidably receive the cam arm 27 of the primary slide 20*a*, as shown in FIG. 27. The secondary slide 30*a* also presents a guide groove 39 designed to slidably receive the guide arm 29 of the primary slide 20*a*. The front face 35 of the secondary slide 30 has a bored hole 36' therein, designed to receive one end of a helical spring 36, and the rear face 21''' of the slide block 21 of the primary slide 20*a* is provided with a corresponding bored hole 36'' designed to receive and support the other end of the helical spring 36.

The secondary slide 30*a* has a cam hole 37 extending therethrough which presents a camming rim 37', and whose shape configuration substantially corresponds to the shape configuration of the camming rim 37' of the camming hole 37 associated with the secondary slide 30 as shown in FIG. 9, except that the camming rim 37' of the modified secondary slide 30*a* is in inverted position. It will also be noted that the cam arm receiving groove 34*a* in the secondary slide 30*a* medially intersects certain rim portions of the camming rim 37' of the secondary slide. The camming rim 37' of the secondary slide 30*a* presents seven cam rim portions *a*, *b*, *c*, *d*, *e*, *f* and *g* as shown in FIGS. 26 and 27, which are designed to be engaged by the camming trunnions 45 or 45' when rotated by the associated rotatably mounted escutcheon medallions 40 and 50 as shown in FIG. 34.

The lock case 10, primary slide 20*a* and secondary slide 30*a*, along with the associated leaf spring 33 and the compression spring 36, can be economically manufactured and quickly assembled together at the factory. In assembling these components, the cam arm 27 and guide arm 29 of the primary slide 20*a* are respectively telescoped into the cam arm receiving groove 34*a* and guide groove 39 of the secondary slide 30*a*, and the end portions of the helical spring 36 simultaneously inserted into the bored hole 36' in the front face 35 of the secondary slide 30*a*, and into the bored hole 36'' in the rear face 21''' of the slide block 21 of the primary slide 20*a*. The angular leaf spring 33 is applied to the secondary slide 30*a*, and the assembled primary and secondary slides 20*a* and 30*a* are then inserted through the rear end of the lock case 10 and in sliding relation to the guide channels 11—11 thereof. A set screw 38 is threaded into the reinforcing side wall 12 of the lock slide 10, and the rounded end thereof projected into a horizontally extending closed end slot 38' formed in the adjacent side face of the secondary slide 30*a*, to thereby maintain the secondary slide in operative position in the guide channels 11 of the lock case, as shown in FIG. 26. The set screw 38 also cooperates with the closed end slot 38' to limit the rearward movement of the secondary slide 30*a*, when the expanded compression spring 36 projects the lockbolt 22 in resiliently extended position, and when the camming trunnions 45 and 45' are in neutral position as shown in FIG. 26.

The primary escutcheon medallion 40 as shown in FIGS. 30, 31 and 34, may be similar to the escutcheon medallion 40 shown in FIGS. 13, 14 and 17 and previously described, and may be integrally cast to present a circular outer disc section 41, a smaller diameter inner disc section 43, an axial trunnion 44, and a pair of diametrically opposed camming trunnions 45 and 45', each of which presents a semi-cylindrical camming surface. A bearing stud 46 of reduced diameter projects from the inner end of each of the camming trunnions 45 and 45', and a neck extension 47 projects from the inner end of the axial trunnion 44. The neck extension 47 presents a peripheral groove which receives an expansion washer 48 having radially extending spring fingers 48', and which is locked to the neck extension 47 by a split ring 49.

The secondary escutcheon medallion 50, as shown in FIGS. 32, 33 and 34, may be similar to the escutcheon medallion shown in FIGS. 15, 16 and 18, and presents an outer circular disc section 51 and an inner circular disc section 53. The inner disc section 53 presents an axial hole 54 designed to receive the stud extension 47 associated with the primary escutcheon medallion 40, and its rough interior wall is designed to interlock with the resilient fingers 48' of the locking washer 48 secured to the end extension 47 of the axial trunnion 44 of the primary escutcheon medallion 40. The inner face of the inner disc 53 is also provided with diametrically opposed socket holes 55 designed to receive the bearing studs 46 extending from the camming trunnions 45 and 45' of the primary escutcheon medallion 40. A handle bar 56, formed as shown in FIG. 15 may be secured to the outer face of the outer disc section 51 of the escutcheon medallion, or alternatively, a handle knob 56*a* may be secured to the outer disc section 51 to thereby rotate the escutcheon medallions 40 and 50.

The paired escutcheon medallions 40 and 50 as shown in FIGS. 13–18, or the paired escutcheon medallions 40 and 50 as shown in FIGS. 30–34, are rotatably supported by seating rims fixed to or forming a part of the door side walls. Where the door body B is formed of metal or plastic facing panels 2—2 as indicated in FIG. 18, the facing panels of the door body may be provided with depressed seating rims 42 and 52 as shown in FIG. 18, which are formed by first cutting a circular hole in the facing panels, and then shaping the peripheral edge portion surrounding the hole to provide circular rim walls 42'—52' and inturned seating lips 42''—52'' against which the inner faces of the outer disc sections 41 and 51 of the respective escutcheon medallions are seated.

The outer disc sections 41—51 of the escutcheon medallions 40—50 may also be rotatably supported by a pair of independent seating rims, each shaped in the form of a seating ring 58 as shown in FIG. 34. Each seating ring 58 presents an outwardly extending flange portion 58' designed to be secured as by screws or other suitable means to the adjacent outer faces of the door body, and

an inset ledge portion 58'' within which the outer disc sections 41 or 51 of the escutcheon medallions are rotatably supported.

In assembling the escutcheon medallions 40 and 50 to the door body in operative association with the primary and secondary slides 20*a* and 30*a*, the camming trunnions 45 and 45' are inserted through the camming hole 37 of the secondary slide and with the camming trunnion 45 lowermost as shown in FIGS. 26 and 34. The secondary escutcheon medallion 50 is then applied, and inward pressure exerted on the primary and secondary escutcheon medallions 40 and 50 to spring the locking washer 48 carried by the axial extension 47 into locking engagement with its axial hole 54 of the secondary medallion 50.

As thus made and assembled, the modified door locking assembly shown in FIGS. 26–34 operates in the same manner as the door locking assembly illustrated in FIGS. 19, 21, 23 and 25. When the camming trunnions 45 and 45' of the modified locking assembly are in neutral position as shown in FIG. 26, the neutral cam rim portion *a* of the secondary slide 30*a* is in bearing contact with the lower camming trunnion 45, and the neutral cam rim portion *d* is in contact with the upper camming trunnion 45'. The camming edge *g'* of the cam arm 27 of the primary slide 20*a* is also in abutment against the lower camming trunnion 45, and the expanded spring 36 maintains the front face 21'' of the slide block 21 of the primary slide 20*a* in abutment against the inner face 16' of the face plate 15, with the lockbolt 22 associated therewith in resiliently projecting position, as shown in FIG. 26.

When the lockbolt 22 is depressed as a result of camming engagement with the cam face 102 of the doorframe-supported keeper plate C in the manner shown in FIG. 6, the spring 36 is compressed and the hook portion 28 of the cam arm 27 is moved rearwardly out of contact with the camming trunnion 45, in the manner indicated in FIG. 21. When the door is fully closed, the lockbolt 22 is projected outwardly and into the lockbolt hole 101 of the doorframe-supported keeper plate C, without disturbing the neutral position of the camming trunnions 45 and 45'.

When the door is closed and ready to be locked, the camming trunnions 45 and 45' as shown in FIG. 26 are rotated in a clockwise direction for a distance of approximately ninety degrees, so that the camming trunnion 45 is in bearing contact with the locking cam rim portion *b* of the secondary slide 30*a*, and the camming trunnion 45' is moved to a position adjacent the locking cam rim portion *e* and into abutment against the cam rim portion *f* of the secondary slide 30*a*. This ninety degree rotative movement of the camming trunnions 45 and 45' advances the front face 35 of the secondary slide 30*a* substantially into abutting relation to the rear face 21''' of the slide block 21 of the primary slide 20*a*, which operation compresses the spring 36 and rigidly maintains the lockbolt 22 in rigidly extended position.

When the door is to be unlocked by retraction of the lockbolt 22, the camming trunnions 45 and 45' are manually rotated counter-clockwise to the neutral position shown in FIG. 26, and then further rotated in a counter-clockwise direction for a distance of approximately forty-five degrees, so that the lower camming trunnion 45 as shown in FIG. 26 engages and drives the cam edge *g'* of the cam arm 27 of the primary slide 20*a* rearwardly, to thereby compress the spring 36 and forcibly retract the lockbolt 22 into unlocking position. In the same unlocking operation, the camming trunnion 45' is moved to a position adjacent the limit-stop cam portion *c* of the secondary slide 30*a*, which prevents further rearward movement of the secondary slide 30*a*. When the lockbolt 22 is thus manipulated into retracted position, the door can be opened. When the handle bar 56 or handle knob 56*a* is manually released, the compression spring 36 expands to again project the lockbolt 22 from unlocking position into resiliently extended position, and the cam arm 27 of the primary slide 20*a* is also driven forwardly by expansion of the spring 36 so that its hook portion 28 engages and returns the camming trunnion 45 to neutral position.

Door locking assemblies made in accordance with this invention are uniquely adapted for association with relatively thin doors and thin doorframe-forming posts or pilasters used in dividing interior building space into cubicle compartments, as shown in FIGS. 1 and 4. For purposes of illustration, FIGS. 1 and 4 show one form of hollow metal door B with which the door locking structure A of this invention may be associated, and which is composed of a pair of spaced facing panels 2—2 presenting inturned flanges 3 along the vertical and horizontal edges thereof, and which terminate in outwardly flared lip portions 4 as shown in FIG. 4. The facing panels 2—2 may be braced and stiffened by sound deadening and reinforcing insulation 5, which is placed in position when the facing panels 2—2 are assembled together. Semi-tubular edging strips 6, presenting inturned flange portions 7, are telescoped over the outwardly flared lip portions 4—4 to interlock therewith. Suitable reinforcing brackets 8 are secured to the rear edge of the door body, and through which hinge pintles 8' extend for swingably supporting the doorframe on the adjacent post or pilaster D'.

The front jamb edge of the door body B is provided with a receiving pocket 9 as shown in FIG. 4, through which the guide channels 11—11 of the lock case 10, and the primary and secondary slides supported therein, are inserted, and with the laterally extending bosses 13 in bracing relation against the inner surfaces of the facing panels 2—2. A conforming hole is cut in the inturned flanges 3 to permit insertion of the guide channels 11 of the lock case into the door pocket 9, and the outer faces of the adjacent inturned flange portions 3 provide seating support for the rear faces 16'' of the end extensions of the facing plate 15 of the lock case. The facing plate 15 may be secured in position by providing a locking tongue 18 projecting from each end of the body section 16 of the face plate as shown in FIG. 10, or by alternatively providing a pair of spaced locking studs 19 projecting from each end of the body section 16 of the facing plate 15 as shown in FIG. 27, and over which the adjacent ends of the semi-tubular edging strips 6 are telescoped to secure the face plate 15 in rigid position to the jamb edge of the door body without visible securing means.

The face plate 15 of the lock case 10 presents a body section 16 whose end extensions project beyond the guide channels 11—11 thereof, and these end extensions present rear face portions 16'' designed to seat against the jamb edge or adjacent flange portions 3—3 of the door body. The intermediate rear face portion 16' of the body section 16, which extends between the guide channels 11—11, provides an abutment face against which the front face 21'' of the slide block 21 of the primary slide 20 or 20*a* is designed to abut. The side faces of the door body have circular holes formed therein which open into the lock case receiving pocket 9 of the door body. Seating rims 42—52 as shown in FIG. 18 may be formed in the outer peripheries of these circular holes, or the circular holes may be rimmed by seating rings 58 as shown in FIG. 34, and which provide a seating journal in which the outer disc sections 41 and 51 of the escutcheon medallions 40 and 50 are rotatably journaled.

The front face of the body section 16 of the face plate 15 is preferably provided with a depressed area 17' in surrounding relation to the lockbolt receiving hole 17 therein, to provide swinging clearance for the door stop elements 103 of the keeper structure C mounted on the jamb edge of the adjacent post or pilaster D. Outer face portions 17'' of the body section 16 may be contoured in streamline symmetry with exposed faces of the semi-

tubular edging strips 6 which extend above and below the body section 16 of the face plate 15. The base end of each locking tongue 18 extending from each end of the face plate body section 16, presents inner and outer shoulders 18' against which the terminal end of the adjacent edging strips 6 is designed to abut, and to form a flush and single line joint therebetween. Paired locking studs 19 as shown in FIGS. 26 and 27, and which extend from the opposite ends of the face plate body section 16, may be alternatively used in place of the locking tongues 18, and the base ends of the locking studs 19 also present inner and outer abutment shoulders 19' against which the adjacent ends of the semi-tubular edging strips 6 which telescope thereover, are designed to abut to provide a single line joint between the contoured outer face portions 17'' of the face plate body section and the outer face of the semi-tubular edging strip.

In the cubicle compartment shown in FIGS. 1 and 4, the doorframe for the door body B is provided by the vertical jamb edges of a pair of adjacent posts or pilasters D and D'. For purpose of illustration, the door supporting hinging pilaster D', and the opposite pilaster D which supports the keeper structure C, may be similarly formed from a pair of facing panels 112—112 presenting inturned flanges 113—113 along the exposed vertical and horizontal edges thereof, and which terminate in outwardly flared lip portions 114 as shown in FIG. 4. The facing panels 112—112 may be braced and stiffened by sound deadening and reinforcing insulation 115 which is placed in position when the facing panels 112—112 are assembled together. Semi-tubular edging strips 116—116 presenting inturned flange portions 117 are telescoped over the outwardly flared lip portions 114—114 to interlock therewith. Each of the doorframe-forming pilasters D and D' may be floor supported or ceiling suspended from the horizontal floor wall or the horizontal ceiling wall of the building, and secured thereto by pilaster mounting assemblies (not shown) contained within a telescopic concealing shoe 118. The door supporting pilaster D' is provided with suitable hinge brackets 119 extending from the doorframe-forming jamb edge thereof, and which provides support for the hinge pintles 8' on which the door body is swingably mounted.

The body section 100 of the keeper structure C presents a relatively flat rear face designed to seat against the inturned flanges 113 of the pilaster body D, and has an anchoring lug 104, shaped as shown in FIGS. 5–8, which is telescoped into a conforming hole formed in the inturned flanges 113—113 of the pilaster body and which anchors the keeper structure C in fixed position. The keeper structure C may be further maintained in rigidly fixed position by the provision of a locking tongue 105 extending from each end of its body section 100, and over which the adjacent ends of the upper and lower semi-tubular edging strips 116—116 are designed to snugly telescope to thereby lock the keeper structure in fixed position. The keeper structure C is designed to be reversibly mounted to present its door stop element 103 on either side of the pilaster body D. For example, the keeper structure C may be mounted on the pilaster body D to present its door stop element 103 on the left hand side of the door body shown in FIG. 3, by an end-to-end reversal of the keeper structure when mounted on the jamb edge of the door body.

The terminal end 103' of the door stop element 103 need project only approximately one-eighth of an inch beyond the end of the inclined cam face 102 of the keeper structure, and in no case exceeding one-quarter inch, to provide an adequate stop for the lockbolt 22 associated with the door mounted locking structure A. The depressed front face portion 17' which surrounds the lockbolt receiving hole 17 in the face plate 15, may be correspondingly depressed approximately one-eighth inch to provide swinging clearance for the terminal end portion 103' of the door stop element 103 of the keeper structure C. As thus constructed, the jamb face forming edging strips 6 extending above and below the body section 16 of the door mounted face plate 15, may be positioned closely adjacent the edging strips 116 extending above and below the body section 100 of the pilaster mounted keeper structure C, so that a minimal clearance space between the swinging edge of the door body and the doorframe-forming edge of the pilaster D is attained.

It will be further noted that the body section 100 of the keeper structure C is confined within the jamb edge of the supporting pilaster D, and that no part of the keeper structure C overlaps the side faces of the pilaster body. Dirt collecting projections are thus substantially eliminated. The door stop element 103 presents a rounded outer face and rounded upper and lower ends, and since its projecting terminal end 103' extends only slightly beyond the inclined cam face 102 of the keeper structure, any possibility that the clothing of a person leaving or entering the cubicle may be caught thereon, is avoided.

The keeper structure C may be cast or molded as an integral unit from a suitable metal or a strong and wear-resistant plastic compound, and if cast from metal its exposed faces may be plated with a bright metal. The lockbolt 22 associated with the locking structure A is preferably made from a strong and wear-resistant plastic compound, and when so made, the lockbolt will strike quietly and with little noise against the inner face of the door stop element 103 of the keeper structure when the door is closed; and when so made, the inner face of the door stop element 103 of the keeper structure requires no resilient sound deadening padding.

While certain novel features of this invention have been disclosed herein and are pointed out in the claims, it will be understood that various omissions, substitutions, and changes may be made by those skilled in the art without departing from the spirit of this invention.

What is claimed is:

1. A door locking structure including in combination; a lock case presenting a face plate having a lockbolt hole therein designed to be secured to the jamb edge of a door body, and a case section extending from said face plate and designed for insertion into the door body; a primary slide reciprocably supported in the case section of the lock case, said primary slide including a forwardly projecting lockbolt designed to extend through the lockbolt hole in the face plate of the lock case, and a rearwardly projecting cam member presenting a lockbolt-retracting cam edge portion; a secondary slide reciprocably supported in the case section of the lock case, resilient means extending between said primary and secondary slides, and a camming hole presenting a camming rim extending through said secondary slide; and slide manipulating means rotatably mounted on the door body which includes, a camming element extending into the camming hole of said secondary slide, and external means for manually rotating said camming element in opposite directions from a neutral position, said camming element being normally maintained in neutral position and said lockbolt in resiliently projected position by expansion of said resilient means, said camming element being operative to cam against a cam rim portion of said secondary slide when manually rotated in one direction from neutral position to thereby advance said secondary slide in a direction towards said primary slide with accompanying compression of said resilient means which thereupon maintains the lockbolt of the primary slide in rigidly projected locking position, said camming element being manually rotatable in the opposite direction from locking position to neutral position to thereby permit expansion of said resilient means which thereupon returns the lockbolt of the primary slide to resiliently projected position, said camming element

being further manually rotatable in the opposite direction from neutral position to thereby drive the cam edge portion of the primary slide in a rearward direction and to correspondingly forcibly retract the lockbolt of said primary slide from resiliently projected position to door unlocking retracted position with accompanying compression of said resilient means; said camming element being automatically returned to neutral position with accompanying return of said lockbolt from manually retracted position to resiliently projected position by expansion of said resilient means when said camming element is manually released.

2. A door locking structure including in combination; a lock case presenting a face plate having a lockbolt hole therein designed to be secured to the jamb edge of a door body, and a case section extending from said face plate and designed for insertion into the door body; a primary slide which includes, a body section reciprocably supported in the case section of the lock case, a lockbolt projecting forwardly from said body section and designed to extend through the lockbolt hole in the face plate of the lock case, and a cam member projecting rearwardly from said body section which presents a lockbolt-retracting cam edge portion; a secondary slide reciprocably supported by the case section of the lock case, a resilient spring extending between and supported by said secondary slide and the body section of said primary slide, and a camming hole presenting a camming rim extending through said secondary slide; and slide manipulating means rotatably mounted on the door body which includes, a camming element extending into the camming hole of said secondary slide, and external means for manually rotating said camming element in opposite directions from a neutral position, said camming element being normally maintained in neutral position and said lockbolt in resiliently projected position by expansion of said resilient spring, said camming element being operative to cam against a cam rim portion of said secondary slide when manually rotated in one direction from neutral position to thereby advance said secondary slide in a direction towards said primary slide with accompanying compression of said resilient spring which thereupon mainmains the lockbolt of the primary slide in rigidly projected locking position, said camming element being manually rotatable in the opposite direction from locking position to neutral position to thereby permit expansion of said resilient spring which thereupon returns the lockbolt of the primary slide to resiliently projected position, said camming element being further manually rotatable in the opposite direction from neutral position to thereby drive the cam edge portion of the primary slide in a rearward direction and to corresponding forcibly retract the lockbolt of said primary slide from resiliently projected position to door unlocking retracted position with accompanying compression of said resilient spring; said camming element being automatically returned to neutral position with accompanying return of said lockbolt from manually retracted position to resiliently projected position by expansion of said resilient spring when said camming element is manually released.

3. A door locking structure including in combination; a lock case presenting a face place having a lockbolt hole therein designed to be secured to the jamb edge of a door body, and a case section extending from said face plate and designed for insertion into the door body; a primary slide reciprocably supported in the case section of the lock case, said primary slide including a forwardly extending lockbolt designed to extend through the lockbolt hole in the face plate of the lock case, and a rearwardly projecting member presenting a lockbolt-retracting cam edge portion; a secondary slide reciprocably supported in the case section of the lock case, resilient means extending between said primary and secondary slides, and a camming hole extending through said secondary slide and presenting a neutral cam rim portion and a locking cam rim portion; and slide manipulating means rotatably mounted on the door body which includes, a camming element extending into the camming hole of said secondary slide, and external means for manually rotating said camming element in opposite directions from a neutral position; said resilient means being operative to normally maintain said neutral cam rim portion of the secondary slide and the cam edge portion of said primary slide in resilient abutment against opposite sides of said camming element to thereby resiliently maintain said camming element in neutral position and said lockbolt in resiliently projected position; said camming element being operative to cam against said locking cam rim portion of the secondary slide when manually rotated in one direction from neutral position to locking position to thereby advance said secondary slide in a direction towards said primary slide, with corresponding compression of said resilient means, and maintain the lockbolt of the primary slide in rigidly projected locking position; said camming element being manually rotatable in the opposite direction from locking position to neutral position to thereby permit expansion of said resilient means which thereupon operates to maintain the locking bolt of the primary slide in resiliently projected position with the camming edge portion of the primary slide in resilient abutment against said camming element; said camming element being further manually rotatable in the opposite direction from neutral position to thereby drive the cam edge portion of the primary slide in a rearward direction to correspondingly forcibly retract the lockbolt of said primary slide from resiliently projected position to door unlocking retracted position and to correspondingly compress said resilient means; said resilient means being operative to automatically return said camming element from lockbolt-retracting position to neutral position when said camming element is manually released.

4. A door locking structure including in combination; a lock case presenting a face plate having a lockbolt hole therein designed to be secured to the edge of a door body, a pair of spaced and substantially parallel guide members extending from said face plate and designed for insertion into the door body; a primary slide extending between and reciprocably supported by the guide members of the lock case, said primary slide including a forwardly extending lockbolt designed to extend through the lockbolt hole in the face plate of the lock case, and a rearwardly projecting member presenting a lockbolt-reacting cam edge portion; a secondary slide extending between and reciprocably supported by the guide members of the lock case, resilient means extending between said primary and secondary slides, and a camming hole extending through said secondary slide and presenting a series of cam rim portions; and slide manipulating means rotatably mounted on the door body which includes, a camming trunnion extending through the camming hole in said secondary slide, and external means for manually rotating said camming trunnion in opposite directions from a neutral position; said resilient means being operative to normally maintain a first cam rim portion of said secondary slide and the cam edge portion of said primary slide in resilient abutment against opposite sides of said camming trunnion to thereby resiliently maintain said camming trunnion in neutral position and said lockbolt in resiliently projected position; said camming trunnion being operative to cam against a second cam rim portion of said secondary slide when manually rotated in one direction from neutral position to locking position to thereby advance said secondary slide in a direction towards said primary slide, to correspondingly compress said resilient means, and to maintain the lockbolt of the primary slide in rigidly projected locking position; said camming trunnion being manually rotatable in the opposite direction from locking position to neutral position to thereby permit expansion of said resilient means which thereupon operates to maintain the

locking bolt of the primary slide in resiliently projected position with the camming edge portion of the primary slide in resilient abutment against said camming trunnion; said camming trunnion being further manually rotatable in the opposite direction from neutral position to thereby drive the cam edge portion of the primary slide rearwardly and correspondingly forcibly retract the lockbolt of said primary slide from resiliently projected position to door unlocking retracted position and to correspondingly compress said resilient means; said resilient means being operative to automatically return said camming trunnion from lockbolt-retracting position to neutral position when said camming trunnion is manually released.

5. A door locking structure including in combination; a lock case presenting a face plate having a lockbolt hole therein designed to be secured to the edge of a door body, a pair of spaced and substantially parallel guide members extending from said face plate and designed for insertion into the door body; a primary slide presenting a slide block extending between and reciprocably supported by the guide members of the lock case, a lockbolt fixed to and projecting forwardly from said slide block and designed to extend through the lockbolt hole in the face plate of the lock case, and a cam arm extending rearwardly from said slide block and having a cam slot therein which presents a lockbolt-retracting cam edge portion; a secondary slide extending between and reciprocably supported by the guide members of the lock case, a resilient spring extending between and supported by the secondary slide and the slide block of the primary slide, a guide groove in said secondary slide which receives the cam arm of said primary slide, a camming hole extending through said secondary slide and which presents a camming rim which at least partially exposes the cam edge portion of said primary slide; and slide manipulating means which includes a rotatably mounted camming element extending into the camming hole of said secondary slide and which is designed to be rotated into camming engagement with the camming rim of said secondary slide when rotated in one direction and into camming engagement with the cam edge portion of said primary slide when rotated in the opposite direction, and means for manually rotating said camming element in opposite directions from a neutral position to thereby manipulate said lockbolt into rigidly extended door-locking position when said camming element is rotated in one direction from neutral position, and to manipulate said lockbolt to door-unlocking retracted position when rotated in the opposite direction from neutral position.

6. A door locking structure including in combination; a lock case presenting a face plate having a lockbolt hole therein designed to be secured to the edge of a door body, a case section extending from said face plate and designed for insertion into the door body; a primary slide presenting a slide block reciprocably supported by the case section of the lock case, a lockbolt fixed to and projecting forwardly from said slide block and designed to extend through the lockbolt hole in the face plate of the lock case, and a cam arm extending rearwardly from said slide block and having a cam slot therein which presents a lockbolt-retracting cam edge portion; a secondary slide reciprocably supported by the case section of the lock case, a resilient spring extending between and supported by the secondary slide and the slide block of the primary slide, a guide groove in said secondary slide which receives the cam arm of the primary slide, a camming hole extending through said secondary slide and which presents a camming rim which at least partially exposes the cam edge portion of said primary slide, and means for limiting the reciprocating movement of said secondary slide; and slide manipulating means which includes a rotatably mounted camming element extending into the camming hole of said secondary slide and which is designed to be rotated into camming engagement with the camming rim of said secondary slide when rotated in one direction and into camming engagement with the cam edge portion of said primary slide when rotated in the opposite direction, and means for manually rotating said camming element in opposite directions from a neutral position to thereby manipulate said lockbolt into rigidly extended door-locking position when said camming element is rotated in one direction from neutral position, and to manipulate said lockbolt to door-unlocking retracted position when rotated in the opposite direction from neutral position; said resilient spring being operative to manipulate the lockbolt into resiliently projected position when said camming element is in neutral position.

7. A door locking structure including in combination; a lock case presenting a face plate having a lockbolt hole therein designed to be secured to the edge of a door body, a case section extending from said face plate and designed for insertion into the door body; a primary slide presenting a slide block reciprocably supported in the case section of the lock case, a lockbolt fixed to and projecting forwardly from said slide block and designed to extend through the lockbolt hole in the face plate of the lock case, a guide arm extending rearwardly from said slide block, and a cam arm extending rearwardly from said slide block and having a cam slot therein which presents a lockbolt-retracting cam edge portion; a secondary slide reciprocably supported in the case section of the lock case, a resilient spring extending between and supported by the secondary slide and the slide block of the primary slide, a guide groove in said secondary slide which receives the guide arm of said primary slide, a guide groove in said secondary slide which receives the cam arm of said primary slide, a camming hole extending through said secondary slide and which presents a camming rim which at least partially exposes the cam edge portion of said primary slide; and slide manipulating means which includes a rotatably mounted camming element extending into the camming hole of said secondary slide and which is designed to be rotated into camming engagement with the camming rim of said secondary slide when rotated in one direction and into camming engagement with the cam edge portion of said primary slide when rotated in the opposite direction, and means for manually rotating said camming element in opposite directions from a neutral position to thereby manipulate said lockbolt into rigidly extended door-locking position when said camming element is rotated in one direction from neutral position, and to manipulate said lockbolt to door-unlocking retracted position when rotated in the opposite direction from neutral position; said resilient spring being operative to resiliently maintain said lockbolt in resiliently projected position when said camming element is in neutral position.

8. A door locking structure including in combination; a lock case presenting a face plate having a lockbolt hole therein designed to be secured to the edge of a door body, a case section extending from said face plate and designed for insertion into the door body; a primary slide reciprocably supported in the case section of the lock case and having a forwardly projecting lockbolt designed to extend through the lockbolt hole in the face plate of the lock case, and a rearwardly projecting cam arm having a cam slot therein which presents a lockbolt-retracting cam edge portion; a secondary slide reciprocably supported in the case section of the lock case, a resilient spring extending between said primary and secondary slides, a guide groove in said secondary slide which receives the cam arm of said primary slide, a camming hole extending through said secondary slide and which presents a camming rim which at least partially exposes the cam edge portion of said primary slide; and slide manipulating means including a pair of escutcheon medallions designed to be rotatably mounted on the door body, a camming element extending between and rotatable with said escutcheon medallions, and external means for manually rotating said escutcheon medallions and said camming element in opposite directions from a neutral position,

said camming element being operative to manipulate said lockbolt into rigidly extended door-locking position when said camming element is rotated in one direction from neutral position, and to manipulate said lockbolt to door-unlocking retracted position when rotated in the opposite direction from neutral position, said resilient spring being operative to maintain said lockbolt in resiliently extended position when said camming element is in neutral position.

9. A door locking structure including in combination; a lock case presenting a face plate having a lockbolt hole therein designed to be secured to the edge of a door body, a case section extending from said face plate and designed for insertion into the door body; a primary slide reciprocably supported in the case section of the lock case and having a forwardly projecting lockbolt designed to extend through the lockbolt hole in the face plate of the lock case, and a rearwardly projecting cam arm having a cam slot therein which presents a lockbolt-retracting cam edge portion; a secondary slide preciprocably supported in the case section of the lock case, a resilient spring extending between said primary and secondary slides, a guide groove in said secondary slide which receives the cam arm of said primary slide, a camming hole extending through said secondary slide and which presents a camming rim which at least partially exposes the cam edge portion of said primary slide; and slide manipulating means including a pair of escutcheon medallions designed to be rotatably mounted on the door body, an axial shaft connecting said escutcheon medallions, a camming element extending between said escutcheon medallions and through the camming hole in said secondary slide, and external means for manually rotating said escutcheon medallions and said camming element in opposite directions from a neutral position, said camming element being operative to manipulate said lockbolt into rigidly extended door-locking position when said camming element is rotated in one direction from neutral position, and to manipulate said lockbolt to door-unlocking retracted position when rotated in the opposite direction from neutral position, said resilient spring being operative to maintain said lockbolt in resiliently extended position when said camming element is in neutral position.

10. A door locking structure including in combination; a lock case presenting a face plate having a lockbolt hole therein designed to be secured to the edge of a door body, a case section extending from said face plate and designed for insertion into the door body; a primary slide reciprocably supported in the case section of the lock case and having a forwardly projecting lockbolt designed to extend through the lockbolt hole in the face plate of the lock case, and a rearwardly projecting cam arm having a cam slot therein which presents a lockbolt-retracting cam edge portion; a secondary slide reciprocably supported in the case section of the lock case, a resilient spring extending between said primary and secondary slides, a guide groove in said secondary slide which receives the cam arm of said primary slide, a camming hole extending through said secondary slide and which presents a camming rim which at least partially exposes the cam edge portion of said primary slide; and slide manipulating means including a pair of escutcheon medallions designed to be rotatably mounted on the door body, an axial shaft connecting said escutcheon medallions, diametrically opposed camming trunnions extending between said escutcheon medallions and through the camming hole in said secondary slide, and external means for manually rotating said escutcheon medallions and said camming trunnions in opposite directions from a neutral position, said camming trunnions being operative to manipulate said lockbolt into rigidly extended door-locking position when said camming trunnions are rotated in one direction from neutral position, and to manipulate said lockbolt to door-unlocking retracted position when rotated in the opposite direction from neutral position, said resilient spring being operative to maintain said lockbolt in resiliently extended position when said camming trunnions are in neutral position.

11. A door locking structure including in combination; a lock case presenting a face plate having a lockbolt hole hole therein designed to be secured to the edge of a door body, a case section extending from said face plate and designed for insertion into the door body; a primary slide reciprocably supported in the case section of the lock case and having a forwardly projecting lockbolt designed to extend through the lockbolt hole in the face plate of the lock case, and a rearwardly projecting cam arm having a cam slot therein which presents a lockbolt-retracting cam edge portion; a secondary slide reciprocably supported in the case section of the lock case, a resilient spring extending between said primary and secondary slides, a guide groove in said secondary slide which receives the cam arm of said primary slide, a camming hole extending through said secondary slide and which presents a camming rim which at least partially exposes the cam edge portion of said primary slide; and slide manipulating means including a pair of escutcheon medallions designed to be rotatably mounted on the door body, a camming element extending between and rotatable with said escutcheon medallions and projecting through the camming hole in said secondary slide, and external means for manually rotating said escutcheon medallions and camming element in opposite directions from a neutral position; said resilient spring being operative to resiliently maintain said lockbolt in resiliently projected position when said camming element is in neutral position, and to also maintain a first cam rim portion of said secondary slide and the cam edge portion of said primary slide in resilient abutment against opposite sides of said camming element to thereby resiliently maintain said camming element in neutral position; said camming element being operative to cam against a second cam rim portion of said secondary slide when manually rotated in one direction for a distance of approximately ninety degrees from neutral position to thereby advance said secondary slide in a direction towards said primary slide and correspondingly compress said resilient spring and maintain the lockbolt of the primary slide in rigidly projected locking position; said camming element being manually rotatable in the opposite direction from locking position to neutral position to thereby permit expansion of said resilient spring which thereupon operates to maintain the lockbolt of the primary slide in resiliently projected position with the camming edge of the cam arm of the primary slide in resilient abutment against said camming element; said camming element being further manually rotatable in the opposite direction from neutral position whereby said camming element engages the cam edge portion of said primary slide to thereby drive said primary slide rearwardly to forcibly retract the lockbolt of said primary slide from resiliently projected position to door-unlocking retracted position and accompanied by corresponding compression of said resilient spring; said resilient spring being operative to automatically return said camming element from lockbolt-retracting position to neutral position when said camming element is manually released.

12. A door locking structure including in combination; a lock case presenting a face plate having a lockbolt hole therein designed to be secured to the edge of a door body, a case section extending from said face plate and designed for insertion into the door body; a primary slide reciprocably supported in the case section of the lock case and having a forwardly projecting lockbolt designed to extend through the lockbolt hole in the face plate of the lock case, and a rearwardly projecting cam arm having a cam slot therein which presents a lockbolt-retracting cam edge portion; a secondary slide reciprocably supported in the case section of the lock case, a resilient spring extending between said primary and secondary slides, a guide groove

in said secondary slide which receives the cam arm of said primary slide, a camming hole extending through said secondary slide and which presents a camming rim which at least partially exposes the cam edge portion of said primary slide; and slide manipulating means including a pair of escutcheon medallions rotatably mounted on the door body, an axial shaft connecting said escutcheon medallions, diametrically opposed camming trunnions extending between said escutcheon medallions and through the camming hole in said secondary slide, and external means for manually rotating said escutcheon medallions and said camming trunnions in opposite directions from a neutral position; said resilient spring being operative to resiliently maintain said lockbolt in resiliently projected position when said camming trunnions are in neutral position, and to also maintain a first cam rim portion of said secondary slide and the cam edge portion of said primary slide in resilient abutment against opposite sides of one of said camming trunnions to thereby resiliently maintain said camming trunnions in neutral position; one of said camming trunnions being operative to cam against a second cam rim portion of said secondary slide when manually rotated in one direction for a distance of approximately ninety degrees from neutral position to thereby advance said secondary slide in a direction towards said primary slide and correspondingly compress said resilient spring and maintain the lockbolt of the primary slide in rigidly projected locking position; said camming hole in said secondary slide also presenting an abutment forming cam rim portion against which said companion camming trunnion is designed to abut to thereby prevent further rotative movement of said camming trunnions when locking position is reached; said camming trunnions being manually rotatable in the opposite direction from locking position to neutral position to thereby permit expansion of said resilient spring which thereupon operates to maintain the lockbolt of the primary slide in resiliently projected position with the camming edge of the cam arm of the primary slide in resilient abutment against one of said camming trunnions; said camming trunnions being further manually rotatable in the opposite direction from neutral position whereby said cam arm engaging trunnion operates to draw said cam arm rearwardly to thereby forcibly retract the lockbolt of said primary slide from resiliently projected position to door-unlocking retracted position and correspondingly compress said resilient spring; said resilient spring being operative to automatically return said camming trunnions from lockbolt-retracting position to neutral position when said camming trunnions are manually released.

13. A door locking assembly including in combination, a door locking structure designed for association with a door body and a keeper structure designed for association with an adjacent door frame; said door locking structure including, a lock case presenting a face plate having a lockbolt hole therein designed to be secured to the jamb edge of a door body, and a case section extending from said face plate and designed for insertion into the door body; a primary slide reciprocably supported in the case section of the lock case, said primary slide including a forwardly projecting lockbolt designed to extend through the lockbolt hole in the face plate of the lock case, and a rearwardly projecting cam member presenting a lockbolt-retracting cam edge portion; a secondary slide reciprocably supported in the case section of the lock case, resilient means extending between said primary and secondary slides, and a camming hole presenting a camming rim extending through said secondary slide; and slide manipulating means rotatably mounted on the door body which includes, a camming element extending into the camming hole of said secondary slide, and external means for manually rotating said camming element in opposite directions from a neutral position, said camming element being normally maintained in neutral position and said lockbolt in resiliently projected position by expansion of said resilient means, said camming element being operative to cam against a cam rim portion of said secondary slide when manually rotated in one direction from neutral position to thereby advance said secondary slide in a direction towards said primary slide with accompanying compression of said resilient means which thereupon maintains the lockbolt of the primary slide in rigidly projected locking position, said camming element being manually rotatable in the opposite direction from locking position to neutral position to thereby permit expansion of said resilient means which thereupon returns the lockbolt of the primary slide to resiliently projected position, said camming element being further manually rotatable in the opposite direction from neutral position to thereby drive the cam edge portion of the primary slide in a rearward direction and to correspondingly forcibly retract the lockbolt of said primary slide from resiliently projected position to door-unlocking retracted position with accompanying compression of said resilient means, said camming element being automatically returned to neutral position with accompanying return of said lockbolt from manually retracted position to resiliently projected position by expansion of said resilient means when said camming element is manually released; said keeper structure having a body section designed to be mounted on the jamb edge of a door frame, said body section presenting a lockbolt receiving pocket designed to receive the end portion of the lockbolt when in extended position, an inclined cam face leading to and on one side of said lockbolt receiving pocket, and a doorstop element presenting an abutment face substantially in alignment with the other side of said lockbolt receiving pocket and against which one side of the lockbolt is designed to abut when said lockbolt is in retracted position, the lockbolt of said door locking structure presenting a rounded end designed to cam over the inclined cam face of said keeper structure when said lockbolt is in resiliently extended position and to plunge into said receiving pocket when the door has been swung into closed position.

14. A door locking structure including in combination; a lock case presenting a face plate having a lockbolt hole therein designed to be secured to the jamb edge of a door body, and a case section extending from said face plate and designed for insertion into the door body; a primary slide reciprocably supported in the case section of the lock case, said primary slide including a forwardly projecting lockbolt designed to extend through the lockbolt hole in the face plate of the lock case, and a rearwardly projecting cam member presenting a lockbolt-retracting cam edge portion; a secondary slide reciprocably supported in the case section of the lock case, resilient means extending between said primary and secondary slides, and a camming hole presenting a camming rim extending through said secondary slide; and slide manipulating means which includes a rotatably mounted camming element extending into the camming hole of said secondary slide and which is designed to be rotated into camming engagement with the camming rim of said secondary slide when rotated in one direction and into camming engagement with the cam edge portion of said primary slide when rotated in the opposite direction, and means for manually rotating said camming element in opposite directions from a neutral position to thereby manipulate said lockbolt into rigidly extended door-locking position when said camming element is rotated in one direction from neutral position, and to manipulate said lockbolt to door-unlocking retracted position when rotated in the opposite direction from neutral position.

15. A door locking structure including in combination; a lock case presenting a face plate having a lockbolt hole therein designed to be secured to the jamb edge of a door body, and a case section extending from

said face plate and designed for insertion into the door body; a primary slide which includes, a body section reciprocably supported in the case section of the lock case, a lockbolt projecting forwardly from said body section and designed to extend through the lockbolt hole in the face plate of the lock case, and a cam member projecting rearwardly from said body section which presents a lockbolt-retracting cam edge portion; a secondary slide reciprocably supported by the case section of the lock case, a resilient spring extending between and supported by said secondary slide and the body section of said primary slide, and a camming hole presenting a camming rim extending through said secondary slide; and slide manipulating means which includes a rotatably mounted camming element extending into the camming hole of said secondary slide and which is designed to be rotated into camming engagement with the camming rim of said secondary slide when rotated in one direction and into camming engagement with the cam edge

portion of said primary slide when rotated in the opposite direction, and means for manually rotating said camming element in opposite directions from a neutral position to thereby manipulate said lockbolt into rigidly extended door-locking position when said camming element is rotated in one direction from neutral position, and to manipulate said lockbolt to door-unlocking retracted position when rotated in the opposite direction from neutral position; said resilient spring being operative to manipulate the lockbolt into resiliently projected position when said camming element is in neutral position.

References Cited in the file of this patent

UNITED STATES PATENTS

1,463,385	Butterworth	July 31, 1923
2,253,496	Cordrey et al.	Aug. 26, 1941
2,631,878	Backhouse	Mar. 17, 1953
2,876,873	Benham	Mar. 10, 1959