June 13, 1967 N. A. WELCH 3,324,692

DOOR LOCK

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Fig. 1.

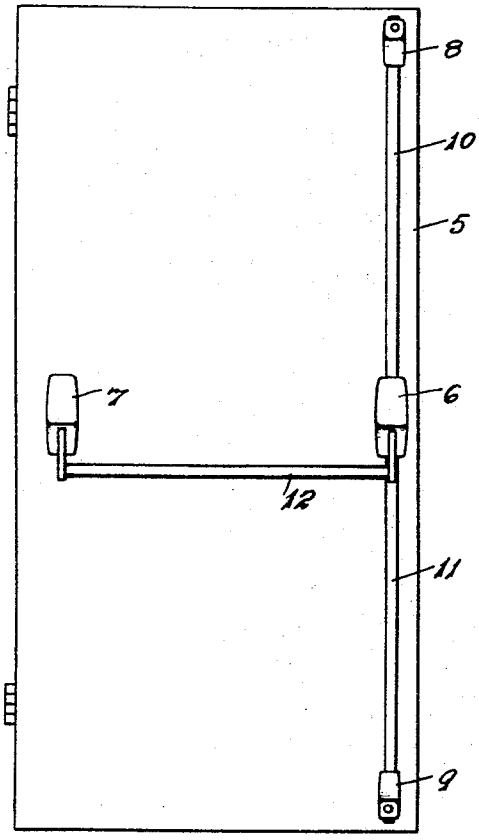


Fig. 4.

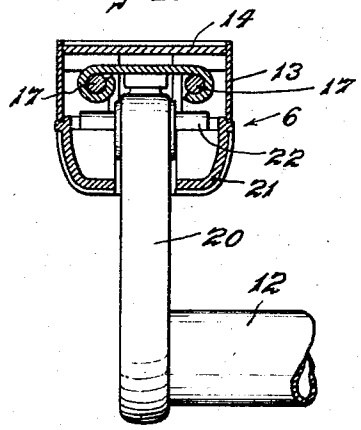


Fig. 2.

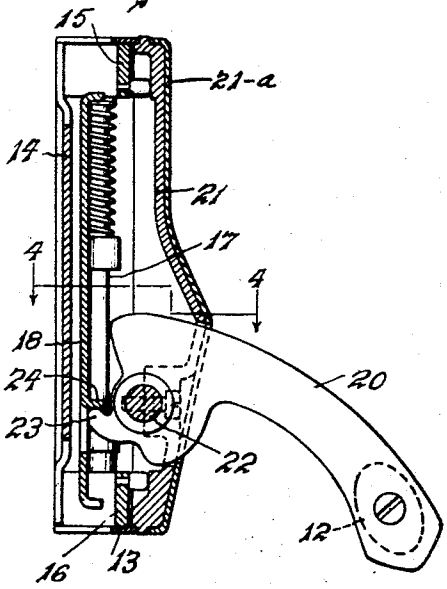
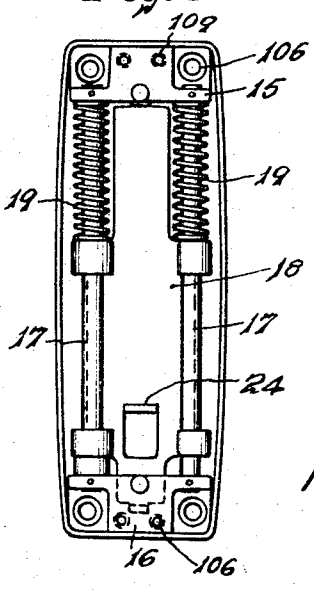


Fig. 3.



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Fig. 7.

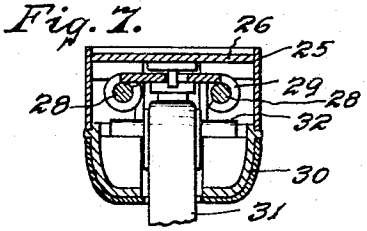


Fig. 5.

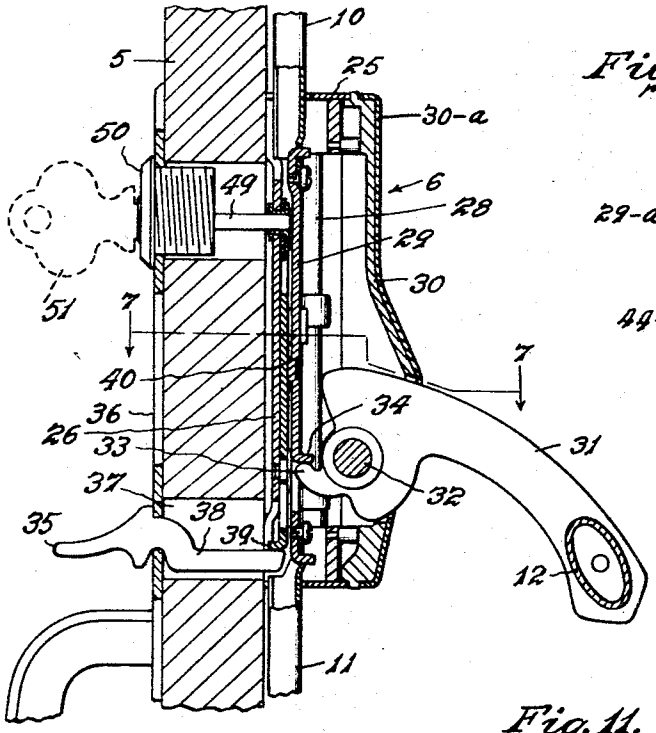


Fig. 6.

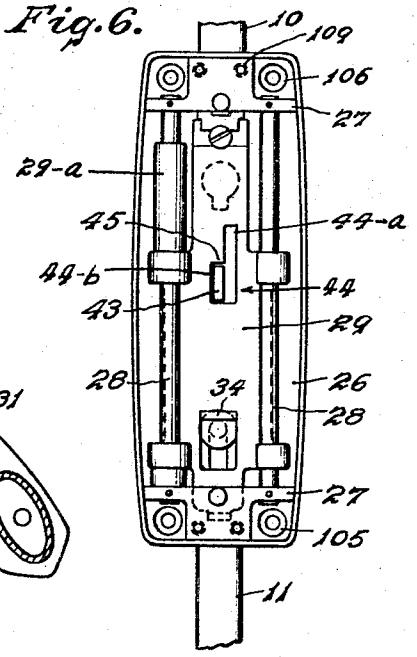


Fig. 11.

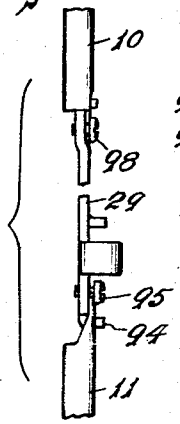


Fig. 12.

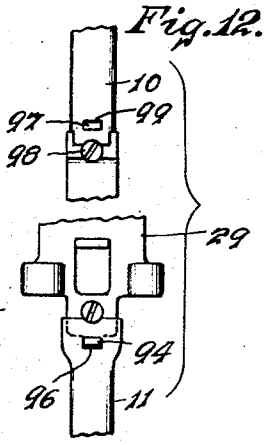


Fig. 8.

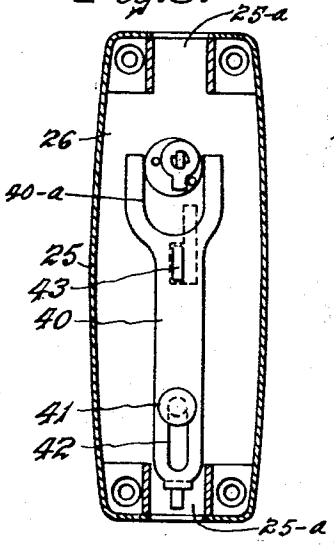
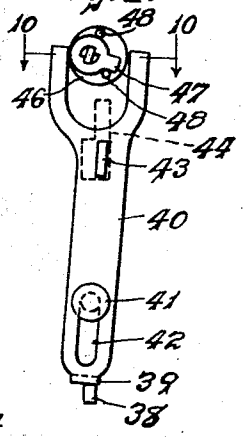


Fig. 10.



Fig. 9.



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Fig. 13.

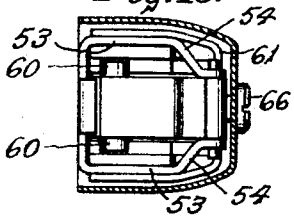


Fig. 15.

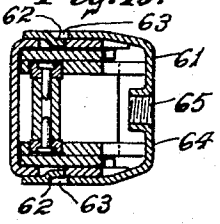


Fig. 30.

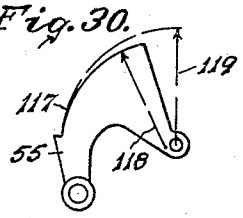


Fig. 14.

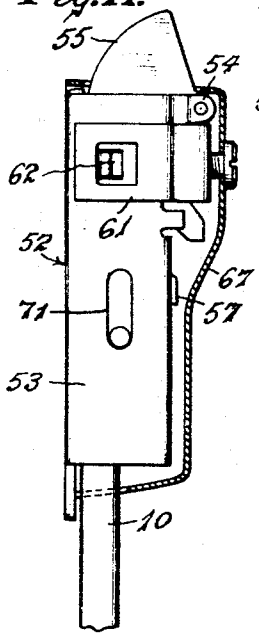


Fig. 16.

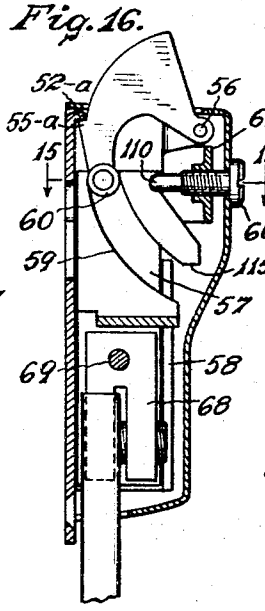


Fig. 17.

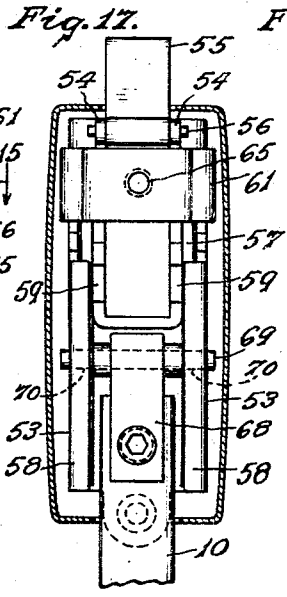


Fig. 18.

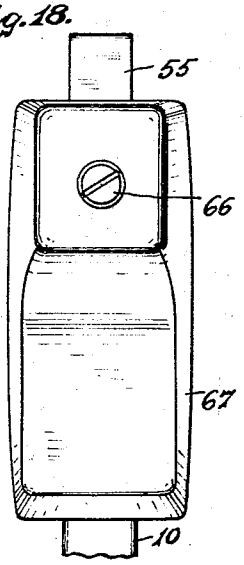


Fig. 19.

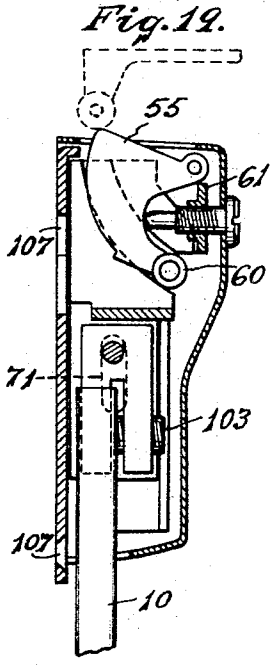


Fig. 20.

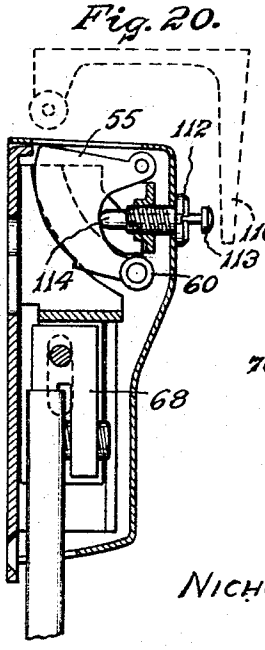


Fig. 21.

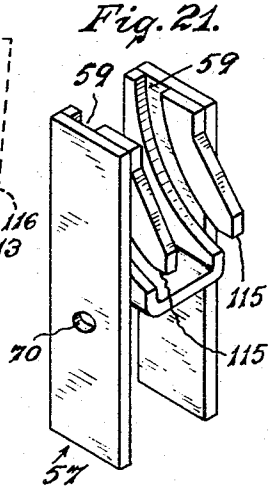


Fig. 22.

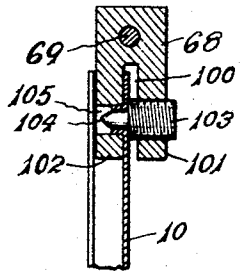
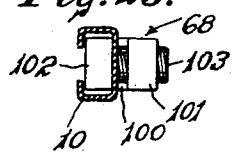


Fig. 23.



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Fig. 24.

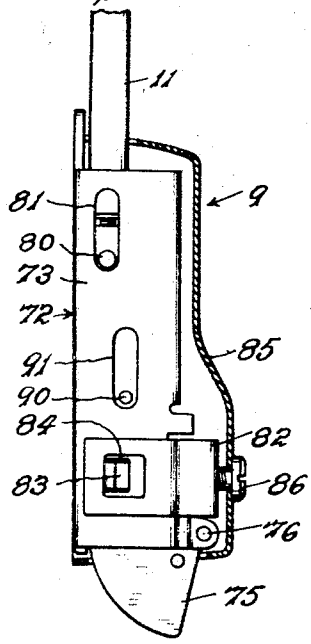


Fig. 25.

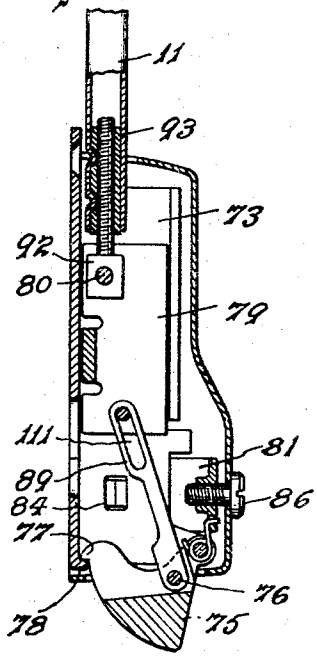


Fig. 26.

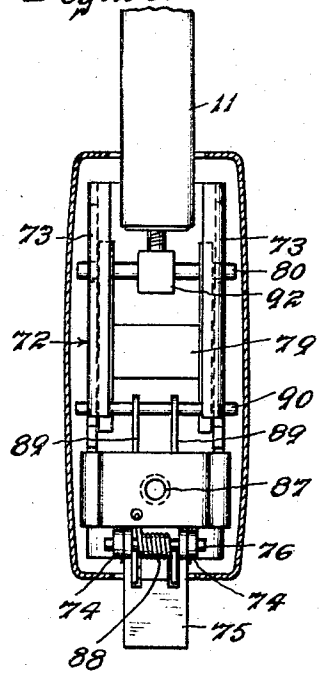


Fig. 27.

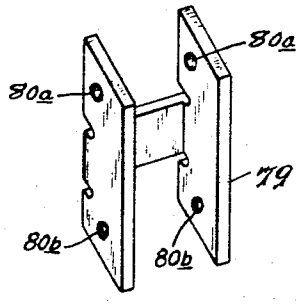


Fig. 28.

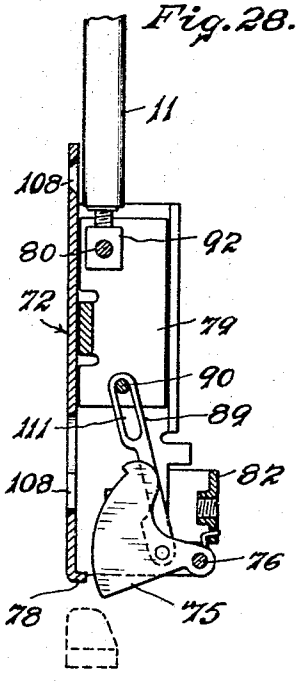
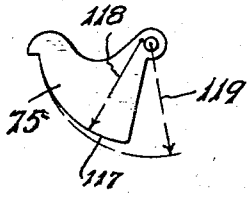


Fig. 29.



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United States Patent Office 3,324,692
Patented June 13, 1967

3,324,692

DOOR LOCK

Nicholas A. Welch, West Hartford, Conn., assignor to Emhart Corporation, Bloomfield, Conn., a corporation of Connecticut

Filed Sept. 3, 1964, Ser. No. 394,275
12 Claims. (Cl. 70—92)

This invention relates to door locks of the type generally referred to in the trade as "emergency-exit locks," and more specifically to emergency-exit locks of the vertical rod type such as generally include a top and a bottom attach unit and an intermediate, panic-bar actuated mechanism that is operatively connected to said latch units by rods disposed vertically on the door.

Locks of the present type are most commonly used on outwardly opening exit doors of public buildings, such as schools, hospitals, theatres and the like, where large numbers of people can be expected to gather, to permit quick and easy egress from the building at all times and particularly in the event of panic resulting from fire or similar causes. Such locks are especially intended for application to single doors where top and bottom latching is desired and to a pair of doors not equipped with a mullion or an astragal. They are also commonly applied to the inactive leaf of a pair of doors where the active leaf carries an astragal and is equipped with an emergency-exit fixture of the mortise type. Of course, such locks also have other practical applications, but the foregoing examples represent the most common types of installations.

The latchbolt retracting mechanism of such locks is, for reasons of safety, operable at all times by means of the panic-bar. Said panic-bar extends horizontally across the inner side of the door and is supported by a pair of operating levers, one of which is pivotally mounted on an "active" lock case, that is, the lock case which carries the latchbolt retracting mechanism, and the other of which is pivotally mounted on an "inactive" or supporting case which is secured to the inner side of the door opposite the active case. Preferably, the latchbolts are retracted by depressing the panic-bar since this will insure automatic retraction of the latchbolts should people crowd against the inside of the door.

In addition to the basic function which merely provides for panic-bar retraction of the latchbolts from the inner side of the door, it is generally necessary to furnish emergency-exit locks of the present type with mechanism permitting retraction of the latchbolts from the outer side of the door by manually operable means. The manually operable means is usually in the form of a knob or a thumbpiece which is mounted on the outer face of the door, and in functions including a knob or a thumbpiece, key operated means such as a conventional pin-tumbler lock cylinder are usually provided on the outer side of the door for selectively rendering the manually operable means operable or inoperable. In any event, it is important to provide an emergency-exit lock which can easily be adapted to a variety of different functions.

It is also extremely important that the emergency-exit lock be readily adaptable to doors of either hand and easily reversed in the field if necessary. If the lock is not reversible—in other words, if the lock is "handed"—it is necessary to provide two distinct types of active cases for the lock, one for right hand doors and another for left hand doors. Not only does this materially increase the cost of manufacture, but it also complicates the factory assembly of the lock and its installation in the field.

In addition, it is important to provide emergency-exit locks of the vertical rod type with means for holding the latchbolts in retracted position while the door is open. This is especially true for installations where there is no

threshold plate at the bottom of the door since if the bottom latchbolt were allowed to project, it would drag along the floor as the door swings toward closed position and eventually cause an unsightly mark on the floor. It is also desirable to have the latchbolts remain in retracted position so that they will not interfere with the closing movement of the door. However, means should be provided for readily rendering the holdback means inoperable.

Accordingly, it is a principal object of the present invention to provide an emergency-exit lock which can be used on both right and left hand doors.

Another important object of the present invention is to provide an emergency-exit lock which permits quick and easy reversal of the active and inactive cases in the field, even by unskilled persons.

Still another object of the invention is to provide an emergency-exit lock in which the active and inactive mechanisms can be reversed relatively to the operating levers on the panic-bar, thereby permitting facile adaption of the lock to either a right or a left hand door.

Another and very important object of the invention is to provide an emergency-exit lock in which reversal does not require removal of the operating levers from their pivotal mountings.

Another object of the present invention is to provide an extremely novel latchbolt retracting mechanism for emergency-exit locks which is adapted for panic-bar operation alone and with which other components may be used to obtain a variety of different functions.

An additional object of the invention is the provision of an emergency-exit lock of the vertical rod type in which the latchbolts may be retracted from the outer side of the door by a knob or a thumbpiece and in which key operable means are provided for selectively disabling the knob or thumbpiece when it is desired to prevent retraction of the latchbolts thereby.

Still another object of the invention is to provide an emergency-exit lock of the vertical rod type wherein the top and bottom latch units may easily be adjusted for use on doors with or without a threshold plate.

A further object is to provide such a lock having selectively operable holdback means for holding the latchbolts in retracted position and in which said holdback means, if effective, are automatically released to permit the latchbolts to engage their respective keepers when the door reaches its substantially fully closed position.

Another object of the invention is to provide a vertical rod emergency-exit lock incorporating means which permit the top and bottom rods to be both cut to the proper length and assembled on the job and wherein novel means are provided for attaching the upper rod to the top latch unit.

A very important object of the invention is to provide top and bottom latch units for the lock in which the latchbolts are adapted to gradually move into projected position and wedge themselves tightly against their respective keepers to minimize latching noises and prevent the door from rattling.

Another, but by no means final, object of the invention is to provide a vertical rod emergency-exit lock in which many of the same components may be used for the active and the inactive cases.

The foregoing and other objects and advantages of the invention will be apparent from the following description and the accompanying drawings in which:

FIG. 1 is an elevational view of the inside face of a door having an emergency-exit lock embodying the present invention mounted thereon.

FIG. 2 is a sectional side view of the inactive case of said lock.

FIG. 3 is an elevational front view of the base section of said inactive case with the cover thereof removed.

FIG. 4 is a sectional plan view on line 4—4 of FIG. 2.

FIG. 5 is a sectional side view of the active case of said lock, showing the same mounted on a door equipped with a thumbpiece and an outside cylinder.

FIG. 6 is an elevational front view of the base section of said active case with the cover thereof removed.

FIG. 7 is a sectional plan view on line 7—7 of FIG. 5.

FIG. 8 is a sectional front view of the base section of the active case further illustrating the mechanism contained therein.

FIG. 9 is an elevational front view illustrating the operation of the key controlled means provided in said active case for disabling the thumbpiece.

FIG. 10 is a sectional plan view on line **10—10** of FIG. 9.

FIG. 11 is a fragmentary elevational side view illustrating the manner in which the vertical rods are attached to the mechanism of said active case.

FIG. 12 is an elevational front view of the assembly shown in FIG. 11.

FIG. 13 is a plan view of the top latch unit with the cover thereof shown in section.

FIG. 14 is a side view of said top latch unit, also with the cover thereof shown in section.

FIG. 15 is a sectional plan view of said top latch unit taken on line **15—15** of FIG. 16, but with the cover thereof removed.

FIG. 16 is a sectional side view further illustrating said top latch unit.

FIG. 17 is a front view thereof with the cover shown in section.

FIG. 18 is an elevational front view of said top latch unit.

FIG. 19 is a sectional side view of said top latch unit showing the latch bolt thereof in the retracted position which it occupies when the holdback means is inoperable.

FIG. 20 is a similar view of said top latch unit illustrating the operation of said holdback means.

FIG. 21 is an isometric view of the slide for said top latch unit.

FIG. 22 is a sectional side view illustrating the means I have devised for attaching the end of the upper vertical rod to said top latch unit.

FIG. 23 is a sectional bottom view thereof.

FIG. 24 is a side view of the bottom latch unit showing the cover thereof in section.

FIG. 25 is a side view of said bottom latch unit in central vertical section.

FIG. 26 is a front view of said bottom latch unit showing the cover thereof in section.

FIG. 27 is an isometric view of the slide for said bottom latch unit.

FIG. 28 is a sectional side view further illustrating said bottom latch unit.

FIG. 29 is a diagrammatic side view illustrating the formation of the latchbolt for said bottom latch unit.

FIG. 30 is a similar view of the latchbolt for the top latch unit.

Briefly state, this invention contemplates an emergency-exit lock of the vertical rod type in which the active and inactive cases each consist of a base section which is adapted to be fastened to a door and a cover member which is detachably secured to the base section. The cover members form part of the operating unit for the lock which includes, in addition, a pair of operating levers pivotally mounted one on each of said covers and an elongated panic-bar which is affixed at its opposite ends to said levers.

The base section of the active case carries the latchbolt retracting mechanism of the lock and said mechanism is connected to top and bottom latch units adapted to be mounted, respectively, adjacent the upper and lower edges of the door by a pair of vertical rods. Means are provided in said mechanism for selective engagement by a finger on each of the operating levers to effect retraction of the latchbolts when the panic-bar is depressed. The mechanism in the active base section also includes means adapted for operation from the outer side of the door by a knob or a thumbpiece to effect retraction of said latchbolts and means operable by a key to render said knob or thumbpiece inoperable.

The base section for the inactive case carries spring means for biasing the operating levers and the panic-bar toward their normal positions and said spring means are also adapted to be engaged with either of the fingers on the operating levers.

Except for the mechanism carried thereby, the active and inactive base sections of the present lock are substantially identical to the active and inactive base sections of the lock shown and described in my copending application Ser. No. 389,108, filed Aug. 12, 1964, and now abandoned. This is also true of the case covers, operating levers and panic-bar which go to make up the operating unit of the lock. Hence the case structure of this lock will be only briefly described herein. It should be stated, however, that each of said case covers is adapted to be assembled to either the active or the inactive base section and each of said operating levers is adapted to operatively engage either the latchbolt retracting mechanism or the biasing spring, as the case may be. Stated conversely, the base sections for the active and inactive cases are adapted to be interchanged between the covers and the operating levers carried thereby to adapt the lock to a particular hand of door, thereby obviating the necessity of disassembling the operating levers or the latchbolt retracting mechanism to reverse the lock as in prior devices of this type. This extremely novel feature greatly simplifies the manufacture and assembly of the lock, thereby effecting considerable savings in manufacturing costs, and permits facile installation or reversal of the lock in the field.

Referring now to the drawing, in FIG. 1 I have illustrated a right hand-reverse bevel door **5** having mounted on its inner side one of my improved emergency-exit locks. Said lock includes an active case **6**, an inactive case **7**, a top latch unit **8**, a bottom latch unit **9**, upper and lower vertical rods **10** and **11**, respectively, which connect the latch units to the active case and a panic-bar **12** which extends transversely across the face of the door. The said active and inactive cases are substantially identical, with the exception of the mechanism contained therein, and can be assembled for application to either side of the door without alteration of said mechanism due to the improvements provided by my present invention.

As shown in FIGS. 2, 3 and 4, the said inactive case includes a base section **13** having a base plate **14** on which are mounted upper and lower brackets **15** and **16**, respectively. These brackets carry a pair of spaced, vertically extending, parallel bars **17—17** which slidably support a slide **18** that is biased downwardly by a pair of springs **19—19**, one of which surrounds each of said bars and is anchored against the bracket **15**. An operating lever **20**, which is secured to one end of the panic-bar **12**, is pivotally mounted on a supporting cover **21** by a shaft **22** and has a finger **23** which engages an abutment **24** on the slide **18** and through which the springs **19—19** act to bias the lever **20** and the panic-bar **12** to normal raised position.

The active case **6** (see FIGS. 5 to 8) includes a base section **25** which is identical in shape to the base section **13** and contains a base plate **26** having mounted thereon brackets **27—27** which support spaced, vertically disposed, parallel bars **28—28**. Said bars slidably support a slide **29** in the form of a substantially flat plate **29** to the upper and lower ends of which are attached the ends of the upper and lower vertical rods **10** and **11**, said rods passing through openings **25–*a*—25–*a*** formed in the base section. The slide is biased downwardly by its own weight and the weight of the elements which are connected to it. However, an auxiliary weight **29–*a*** is preferably provided on one or both of the rods **28** to insure proper operation of the slide. A supporting cover **30** identical to the cover

21 is mounted on the base section 25 and carries an operating lever 31 which is identical to the lever 20, but of the opposite hand. Said lever 31 is pivotally mounted on said cover by a shaft 32 and is also connected to the panic-bar 12. Said operating lever has a finger 33 which engages the underside of an abutment 34 on the slide 29 for lifting said slide and the rods 10 and 11 when the panic-bar is depressed to cause actuation of the top and bottom latch units 8 and 9, as will be hereinafter described.

The manually operable means that I have shown for retracting the latchbolts from the outer side of the door 5 include a thumbpiece 35 which is pivotally mounted in an escutcheon 36 that is secured to the outer face of the door. Said thumbpiece extends through a hole 37 in said door and has a stem portion 38 which underlies an abutment 39 on a rocker member 40 that is pivotally and longitudinally slidably mounted on the base plate 26 behind the slide 29 by means of a stud 41 which is secured to said base plate and extends through a longitudinal slot 42 in said rocker. Said rocker member is provided with a detent 43 that projects therefrom into an opening 44 in the slide 29. Said opening has a vertically elongated portion 44–*a* and a shorter, laterally offset portion 44–*b* defining a downwardly facing shoulder 45 on said slide that is engageable by said detent 43 to connect the slide 29 to the rocker member 40 for simultaneous movement therewith. The rocker member 40 is shifted between its effective position shown in FIGS. 6 to 8, wherein the detent is engageable with the shoulder 45, and its ineffective position shown in FIG. 9, wherein the detent 43 is disposed in alignment with the elongated portion of the opening 44, by means of an eccentrically mounted, circular cam 46 that is disposed in a notch 40–*a* formed in the upper end of said rocker member. Said cam is rotatably mounted on the shank of an operating finger 47 that is, in turn, rotatably mounted in the base plate 26 and arranged to engage spaced studs 48—48 on said cam to effect rotation thereof in opposite direction. The operating finger 47 is adapted to be rotated by a connecting link 49 extending from the key plug of a conventional lock cylinder 50, said key plug being operable from the outer side of the door by a suitable key 51. The studs 48—48 provide a lost motion connection between the finger 47 and the cam 46 which permits the key plug of the lock cylinder to be returned to shed position without moving the cam after the rocker member has been shifted to either its effective or ineffective position.

The top latch unit illustrated in FIGS. 13 to 21, includes an elongated casing 52 having side walls 53—53 with forward extensions 54—54 at the top thereof between which a latchbolt 55 is pivotally mounted by means of a pivot pin 56, the said latchbolt having a stop 55–*a* which engages an abutment 52–*a* on the casing to limit movement of said latchbolt to its projected position. A slide 57 is slidably retained in said casing by flanges 58—58 and has opposed cam grooves 59—59 in the side walls thereof which receive rollers 60—60 projecting from the opposite sides of the latchbolt. A yoke 61 straddles the side walls of the casing 52 and is detachably secured thereto by means of prongs 62—62 which snap into openings 63—63 in said side walls. The front portion 64 of said yoke has a centrally located threaded hole 65 to receive a screw 66 for securing the cover 67 of said latch unit to the casing 52.

The slide 57 of said top latch unit carries a connector 68 that is secured to the slide by a pin 69 which extends through holes 70—70 in the opposite side walls of said slide and through slots 71—71 in the side walls of the casing 52, said connector being provided for securing the upper vertical rod 10 to the slide in the manner hereinafter fully described.

As shown in FIGS. 24 and 28, the bottom latch unit 9 includes an elongated casing 72 having side walls 73—73 with forward extensions 74—74 at the bottom thereof between which a latchbolt 75 is pivotally mounted by means of a pivot pin 76 that extends through said extensions, the said latchbolt having a stop 77 which engages an abutment 78 on the casing 72 for limiting movement of the said latchbolt to its projected position as clearly shown in FIG. 25.

A slide 79 is slidably mounted between the side walls of the casing 72 and is connected to the lower vertical rod 11 by means of a pin 80 which extends through openings 80–*a*—80–*a* in the side walls of said slide and through slots 81 in the side walls of said casing. A yoke 82 is detachably connected to the said casing by prongs 83 which engage holes 84 in the side walls thereof, and a cover 85 is secured to said casing by means of a screw 86 which is threaded to a hole 87 disposed centrally in the front wall of said yoke.

The latchbolt 75 is biased toward its projected position, shown in FIG. 25, by a spring 88 which is anchored on said yoke 82, and the said latchbolt is pulled against the tension of said spring into its retracted position by a pair of links 89—89 which are pivotally secured to the latchbolt and slidably connected to said slide 79 by means of a pin 90 which extends through holes 80–*b*—80–*b* in the side walls thereof and slots 91 in the side walls of the casing 72.

It is desirable that said mechanism be supplied to the ultimate user in such a condition that it can easily be installed on a door. To this end, the lower vertical rod 11 is supplied in a standard length and has provided on its lower end a connector 92 which is secured to the slide 79 by the pin 80 and is threaded into an insert 93 that is secured in the lower end of the said rod so that the effective length of the rod may be adjusted to conform to the distance between the active case 6 and the bottom latch unit 9 by rotating the said connector 92 in the proper direction before it is secured to the slide 79.

Reverting to FIGS. 11 and 12, the slide 29 in the active base section 25 has a projection 94 at the bottom thereof and a screw 95 threaded thereto adjacent said projection. The upper end of the lower rod 11 has a hole 96 to receive said projection 94 whereby said rod may be readily attached to the slide by merely placing said rod over the projection 94 and tightening the screw 95 against its end portion, as shown. The upper end of the slide 29 has a similar projection 97 and a screw 98 adjacent thereto and the lower end of the upper rod 10 has a hole 99 whereby it can be fastened to the slide 29 in the same manner as the upper end of the lower rod 11.

In order to fasten the upper end of the upper rod 10 to the top latch unit, the connector 68 is provided with a slot 100 defining thereon a pair of spaced legs 101 and 102, as shown in FIGS. 22 and 23. A socket type screw 103 is threaded to the leg 101 and has a point 104 which extends into a hole 105 in the leg 102, but is of a smaller diameter than said hole. The upper end of said upper rod is secured to the top latch unit by first cutting it to the proper length to conform to the distance between the active case 6 and the top latch unit 8 and then inserting the said upper end of the rod into the slot 100 and rotating the screw 103 until the point 104 thereof penetrates the front wall of said rod and forms an eyelet which extends into the hole 105. This firmly secures the rod to the connector 68 as clearly illustrated in FIG. 22.

To mount the lock on the door, in the position illustrated in FIG. 1 for example, the active and inactive base sections 13 and 25 are first secured to the door by screws inserted through holes 106 in the brackets 15—15 and 27—27 thereof, and the top and bottom latch units are then secured to the door in their proper positions by screws inserted through holes 107—107 and 108—108 in the casings 52 and 72 thereof, respectively. In order to facilitate the assembly and installation of the latch units, the pins 69, 80 and 90 are adapted to be readily removed or installed through the respective slots in the side walls of the casings 52 and 72 and once installed are retained in their assembled positions by the covers 67 and 85.

After the active and inactive base sections and the top

and bottom latch units have been mounted on the door as above described, the upper and lower vertical rods **10** and **11**, respectively, are secured to said latch units and active case in the manner also above described. The operating unit, consisting of the supporting covers **21** and **30**, the operating levers **20** and **31** and the panic-bar **12**, is then simply mounted in position on said base sections with the fingers **23** and **33** of the respective operating levers engaged with the abutments **24** and **34** on the slides **18** and **29**, respectively, and the said covers are then secured to their respective cases by screws, not shown, which are threaded into holes **109** in the brackets **15—15** and **27—27**. Decorative scalps **21–*a*** and **30–*a*** are provided for concealing the covers **21** and **30** and, to complete the installation, these scalps are then installed in the manner fully described in my above-mentioned copending application Ser. No. 389,108.

As will be evident from the foregoing description and from the disclosure of my above identified copending application, the base sections **13** and **25** are adapted to receive either of the cover members **21** or **30** and the mechanism contained in said base sections is adapted for operative engagement with either of the fingers **23** or **33** on the levers **20** or **31**, respectively. This extremely novel arrangement renders the emergency-exit lock of this invention readily adaptable to doors of either hand and permits facile reversal thereof in the field.

For example, when applying the lock to a right hand door, the active base section **25** is mounted adjacent the right hand or free edge of the door and the inactive base section **13** is mounted adjacent the left hand or hinged edge as shown in FIG. 1. The operating unit, which consists of the cover members **21** and **30**, their scalps **21–*a*** and **30–*a*** and operating levers **20** and **31** and the panic-bar **12** is then assembled to the base sections as previously described, the right hand cover member of FIG. 1 being applied to the base section **25** to form the active case and the left hand cover member being applied to the base section **13** to form the inactive case.

For a left hand door, the base sections **13** and **25** are reversed with respect to the cover members **21** and **30**. In this instance, however, it is not necessary to invert the active base section as in the lock of said copending application. Both the base section **13** and the base section **25** are adapted to operate in the position shown in FIGS. 3 and 6 irrespective of the hand of the door.

After the installation has been completed, the force exerted by the springs **19—19** in the inactive case on the finger **23** through the slide **18** will bias the operating lever **20** and the panic-bar **12** to normal raised position. This will also retain the operating lever **31** of the active case in its raised position and thus permit the slide **29** of the active case to normally assume its lowermost position, as shown in FIG. 5. When the said slide **29** moves into its normal position, the upper rod **10** and the slide **57** will move downwardly therewith and cause the latchbolt **55** to be pivoted into its projected position by cooperation between the cam grooves **59—59** in said slide and the rollers **60—60** on the latchbolt, as shown in FIGS. 14 to 18. Movement of the slide **29** to its lower-most position will also be accompanied by downward movement of the lower vertical rod **11** and the slide **79** of the lower latch unit and thereby permit the latchbolt **75** to be pivoted to its projected position by the spring **88**, as illustrated in FIGS. 24 and 26.

When pressure is applied to the panic-bar **12**, against the tension of the springs **19—19**, the operating lever **31** will pivot downwardly, whereupon the finger **33** thereof will raise the slide **29** of the active case and therewith also raise the upper and lower vertical rods **10** and **11**. The upper rod will then raise the slide **57** of the upper latch unit and cause the latchbolt **55** thereof to be retracted by the action of the cam grooves **59—59** upon the rollers **60—60**, while the lower rod will raise the slide **79** of the lower latch unit to pull on the links **89—89** and thereby pull the lower latchbolt **75** into its retracted position so that the door may be swung open.

In some installations where there is a threshold plate at the bottom of the door, it is desirable that the latchbolts of the top and bottom latch units remain in their projected positions when the door is open so that they will be retracted as they engage their respective keepers and then be projected back, by gravity, into locking engagement with said keepers as the door reaches its closed position. For this purpose, the screw **66** of the upper latch unit is provided with a projection **110** forming an abutment which will engage the latchbolt **55**, as shown in FIG. 19, and stop it short of its fully retracted position so that, upon the panic-bar being released, it will return to its projected position, whereupon the lower latchbolt will also do the same by virtue of its connection with the upper latchbolt through the said vertical rods and the slide **29** of the active case. It will also be noted that the abutment **34** of the slide **29** is normally free to move away from the finger **33** of the operating lever **31**. This will permit free upward movement of the slide **57** and thereby permit the said slide to be raised independently of said operating lever as the latchbolt **55** is forced into its retracted position by engagement with its keeper. The raising of said slide by retraction of the latchbolt **55** will also cause the slide **79** of the bottom latch unit to be raised and thereby, through the links **89—89**, cause retraction of the latchbolt **75** of said bottom unit. However, the said links are each provided with a slot **111** to permit said links to move relatively to the pin **90** and thereby permit retraction of the latchbolt **75** independently of the slide **79** and the latchbolt **55** of the top latch unit.

In installations where there is no threshold plate at the bottom of the door, it is usually desirable that the bottom latchbolt be held in retracted position until the door is fully closed so that said bolt will not mar the floor. For this purpose, instead of the screw **66** in the top latch unit there is substituted a threaded sleeve **112** for securing the cover **67**, and a plunger **113** is provided which is slidable in said sleeve and has a stem **114** to engage the latchbolt **55**, as clearly shown in FIG. 20. The said stem **114** is shorter than the projection **110** of the screw **66** whereby the latchbolt **55** is permitted to reach its fully retracted position so that the rollers **60—60** engage flats **115—115** at the lower ends of the cam grooves **59—59**. Thus, when the latchbolt **55** is moved to its fully retracted position, illustrated in FIG. 20, by operation of the panic-bar, the rollers **60—60** thereof will come to rest below the flats **115—115**, in which position the axes of the rollers will be substantially in line with their points of contact with the flats and the pivotal axis of said latchbolt **55** whereby, when the panic-bar is released, the slide **57** will be supported by said rollers and retain the latchbolt in its fully retracted position. This will also retain the lower latchbolt **75** in its retracted position by reason of the slide **79** being held in its raised position through its rigid connection with the slide **57**.

When the door is substantially fully closed, the plunger **113** will strike an abutment **116** on the keeper for the latchbolt **55**, shown in dotted lines in FIG. 20, and swing the latchbolt so that the rollers **60—60** move away from the abutments **115—115** into the cam grooves **59—59** and allow the entire vertical rod assembly, to move downwardly and thereby raise the latchbolt **55** to its projected position and also lower the bottom latchbolt **75** to its projected position, whereby said latchbolts will engage their respective keepers just as the door reaches its fully closed position.

In the function illustrated in FIG. 5, the top and bottom latchbolts may be retracted independently of the panic-bar by means of the manually operable thumbpiece. When the rocker member **40** is in its effective position shown in FIGS. 6 and 8, wherein the detent **43** is in register with the shoulder **45**, depression of the thumb-

piece 35 will lift the rocker member and the slide 29 to effect retraction of the latchbolts 55 and 75 in the same manner as when the panic-bar is depressed. However, retraction of the latchbolts from the outer side of the door may be prevented by inserting the key 51 into the key plug of the lock cylinder 50 and rotating said plug in a counterclockwise direction. This will rotate the link 49 and the finger 57 which will, in turn, rotate the cam 46 and tilt the rocker member to its ineffective position shown in FIG. 9 wherein the detent 43 is in register with the elongated section 44–*a* of the opening 44 in the slide 29. Hence, should the thumbpiece now be operated, the rocker member will move idly up and down relatively to said slide. The rocker member may, of course, be returned to its effective position by reverse rotation of the key plug.

Referring now to FIGS. 29 and 30, it will be seen that the arcuate, keeper engaging face 117 of each of the latchbolts 55 and 75 moves away from the pivotal axis of the bolt as it approaches the stop thereon. This slight eccentricity is achieved by forming each of said faces on a radius 118 that is smaller than the radius 119 on which said face would normally lie and extends from a center spaced from the pivotal axis of the bolt. Thus, as the latchbolts move toward projected position they will engage their respective keepers with a wiping action which will retard the movement of the bolts slightly and thereby minimize the latching poises which have heretofore been the source of numerous complaints with emergency-exit locks of the vertical rod type. Moreover, the eccentric faces on the bolts will cause them to cam the door tightly into closed position and thereby eliminate rattles.

While I have herein shown and described my invention in what I have conceived to be the most practical and preferred embodiment, it is recognized that departures may be made therefrom within the scope of my invention which is not to be limited to the details disclosed herein, but is to be accorded the full scope of the claims appended hereto so as to embrace any and all equivalent structures.

I claim:

1. In an emergency-exit lock, an active base section and an inactive base section, at least one latch unit having a latchbolt therein movable between projected and retracted positions, a panic-bar operated mechanism in said active base section, a vertically disposed operating means for operatively connecting said mechanism to said latchbolt and operable upon actuation of said mechanism to effect retraction of said latchbolt, a removable operating unit including a panic-bar having an operating lever secured to each of its opposite ends and a pair of cover units shaped for interchangeable mounting on either of said base sections, each having one of said operating levers pivotally mounted thereon, said mechanism being operable by the respective one of said levers when said active base section is mounted at either the right or the left hand side of a door.

2. In an emergency-exit lock, an active base section, at least one latch unit having a latchbolt therein movable between projected and retracted positions, a panic-bar operated mechanism in said active base section, a vertically disposed operating means for operatively connecting said mechanism to said latchbolt and operable upon actuation of said mechanism to effect retraction of said latchbolt, an operating spring in said inactive base section, a removable operating unit including a panic-bar having an operating lever secured to each of its opposite ends and a pair of cover units shaped for interchangeable mounting on either of said base sections, each having one of said operating levers pivotally mounted thereon, said levers being selectively operatively engageable with either said mechanism or said spring whereby an operative connection can be established therebetween irrespective of the hand of the door on which said base sections are mounted.

3. In an emergency-exit lock, an active base section and an inactive base section, a top and a bottom latch unit each having a latchbolt therein movable between projected and retracted positions, a panic-bar operated mechanism in said active base section vertically disposed operating, means for operatively connecting said mechanism to the latchbolts of said latch units and operable upon actuation of said mechanism to effect simultaneous retraction of said latchbolts, spring means in said inactive base section, an operating unit including a panic-bar, a pair of operating levers secured one to each of the opposite ends of said panic-bar and a pair of cover members on each of which one of said levers is pivotally mounted, each of said cover members being shaped for interchangeable mounting on either of said base sections and each of said operating levers being operatively engageable with either said mechanism or said spring means whereby, when said covers are mounted on said base sections, said mechanism will be operable by the operating lever associated with the active base section and said spring means, acting through the operating lever associated with the inactive base section, will bias said operating levers and the panic-bar into their normal positions.

4. In an emergency-exit lock, an active base section and an inactive base section, each of said sections being of substantially identical exterior configuration, a top and a bottom latch unit each having a latchbolt movable between projected and retracted positions, a panic-bar operated mechanism in said active base section, means for operatively connecting said mechanism to the latchbolts of said top and bottom latch units and operable upon actuation of said mechanism to effect simultaneous retraction of said latchbolts, spring means in said inactive case base section, an operating unit including a panic-bar, a pair of substantially identical operating levers secured one to each of the opposite ends of said panic-bar and a pair of substantially identical cover members each pivotally supporting one of said levers, each of said cover members being shaped for interchangeable mounting upon either of said base sections and each of said operating levers being operatively engageable with either said mechanism or said spring means whereby said base sections may be mounted at either the right or the left hand side of a door and when said cover members are mounted on said base sections and mechanism will be actuated by the operating lever associated with said active base section and said spring means will act through the operating lever associated with the inactive base section to bias said levers and the panic-bar to their normal positions.

5. The subject matter set forth in claim 4 including manually operable means for operating said mechanism independently of the panic-bar, and key-controlled means for rendering said manually operable means inoperable.

6. In an emergency-exit lock, an active case, a top and a bottom latch unit each having a latchbolt movable between projected and retracted positions, said active case having a pair of parallel bars mounted therein, a slide slidably mounted on said parallel bars, an operating lever pivotally carried by said active case for actuating said slide, means including a pair of vertical rods for operatively connecting said slide to the latchbolts of said latch units to effect simultaneous retraction thereof upon actuation of said slide by said operating lever, said slide being movable relatively to said operating lever to effect retraction of said latchbolts independently thereof, a rocker member pivotally and slidably mounted in said active case, a manually operable member for moving said rocker member, detent means connecting said rocker member to said slide to permit movement of said slide by operation of said manually operable member, and key controlled means for pivoting said rocker member to disconnect said detent means from said slide and thereby prevent movement of said slide by operation of said manually operable member.

7. In an emergency-exit lock, an active case including

a base section, a top and a bottom latch unit each having a latchbolt movable between projected and retracted positions, a pair of parallel bars mounted in said base section, a slide slidably mounted on said bars, means including a pair of vertical rods for operatively connecting said slide to the latchbolt of said latch units, a supporting cover detachably mounted on said base section, a panic-bar, an operating lever connected to said panic-bar and pivotally mounted on said supporting cover, abutment means between said operating lever and said slide for moving said slide to effect retraction of said top and bottom latchbolts by panic-bar operation of said lever, said slide being movable to retract said latchbolts independently of said operating lever, a rocker member pivotally and slidably mounted on said base section, detent means for connecting said rocker member to said slide engageable by movement of said rocker member, a manually operable member for moving said rocker member to cause movement of the slide when said detent means are engaged, cam means rotatably mounted on said base section for moving said rocker member to cause engagement and disengagement of said detent means, and key controlled means for rotating said cam means to connect said rocker member to or disconnect it from the slide to selectively control operation of said top and bottom latch units by said manually operable member.

8. In an emergency-exit lock, an active case, an inactive case, said inactive case being substantially the same in size and configuration as said active case, a pair of similar parallel bars mounted in each of said cases, said cases being adapted to be mounted in horizontally spaced relation on a door with said bars disposed in vertical position, a first slide slidably mounted on the bars in the active case, an operating lever pivotally mounted intermediate its ends on said active case and having a finger at its inner end adapted upon depression of its outer end to lift said first slide, a second slide slidably mounted on the bars of said inactive case, a spring means in said inactive case biasing the said second slide therein downwardly, an operating lever pivotally mounted intermediate its ends on said inactive case and having a finger at its inner end engaging said second slide, and a panic-bar connected to the outer ends of said levers, said springs acting through said second slide to yieldingly retain said operating levers and said panic-bar in normal raised position, said active and inactive cases being interchangeably convertible by substitution of said second slide and spring means for said first slide.

9. The subject matter set forth in claim 8 including a weight slidably mounted on at least one of the bars in said active case and engaging said first slide therein to gravitationally bias said slide downwardly in said case.

10. In an emergency-exit lock, an active base section, an inactive base section, each of said base sections having a pair of parallel bars mounted therein and said base sections being adapted to be affixed to a door in horizontally spaced relation with said bars disposed vertically thereon, a slide slidably mounted on the bars in said active base section and adapted to operate a latchbolt, a slide slidably mounted on the bars in said inactive base section, spring means in said inactive base section biasing the slide therein downwardly, an operating unit including a panic-bar, a pair of operating levers affixed one to each of the opposite ends of said panic-bar and a pair of cover members on each of which one of said levers is pivotally mounted, each of said cover members being shaped to be interchangeably mounted on either of said base sections and each of said levers being adapted to operatively engage either of said slides, whereby said slide in the active base section is adapted to be operated by the operating lever associated with the active base section and said spring means, acting through the slide in the inactive base section, biases said levers and the panic-bar to their normal raised positions.

11. In an emergency exit lock, an active case, at least one latch unit having a latchbolt movable between projected and retracted positions, a latchbolt operating mechanism in said active case, a panic bar operated lever pivotally mounted on said active case for actuating said mechanism, means for operatively connecting said mechanism to the said latchbolt and operable upon actuation of said mechanism by said lever to effect retraction of said latchbolt, said mechanism being movable to effect retraction of said latchbolt independently of said lever, a manually operable latch retracting member movable between two extreme positions, an intermediate means forming an operating linkage between said manually operable member and said latchbolt operating mechanism, said means being selectively movable into and out of operative linking engagement between said manually operable member and said mechanism, and key operated means for selectively moving said intermediate means into and out of said operative linking engagement, said manually operable member being freely movable between its extreme positions and being out of engagement with said mechanism when said key operated means has moved said intermediate means out of operative linking engagement.

12. In an emergency exit lock, an active case, at least one latch unit having a latchbolt movable between projected and retracted positions, a slide in said active case, a panic bar operated lever pivotally mounted on said active case for actuating said slide, means for operatively connecting said slide to said latchbolt and operable upon actuation of said slide by said lever to effect retraction of said latchbolt, said slide being movable to effect retraction of said latchbolt independently of said operating lever, a manually operable latch actuating member movable between two extreme positions, an intermediate member forming an operating linkage between said manually operable member and said slide, said member having one portion in engagement with said manually operable member and another portion selectively movable into and out of engagement with said slide, and key operated means for moving said other portion into and out of engagement with said slide, said manually operable member being freely movable between its extreme positions and being out of engagement with said slide when said key operated means has moved said intermediate means out of operative linking engagement.

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