Sept. 8, 1970 B. TUMBIOLO 3,527,069

SECURITY BAR DOOR LOCK ASSEMBLY

Filed May 8, 1968 2 Sheets-Sheet 1

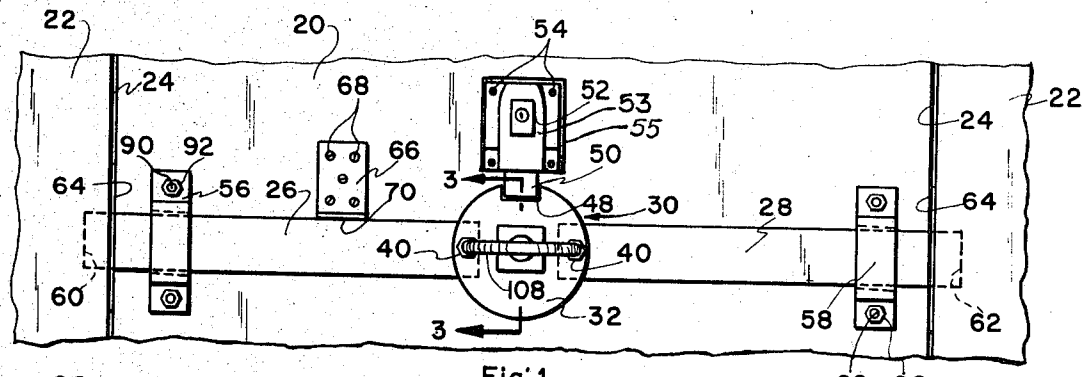



Fig. 1

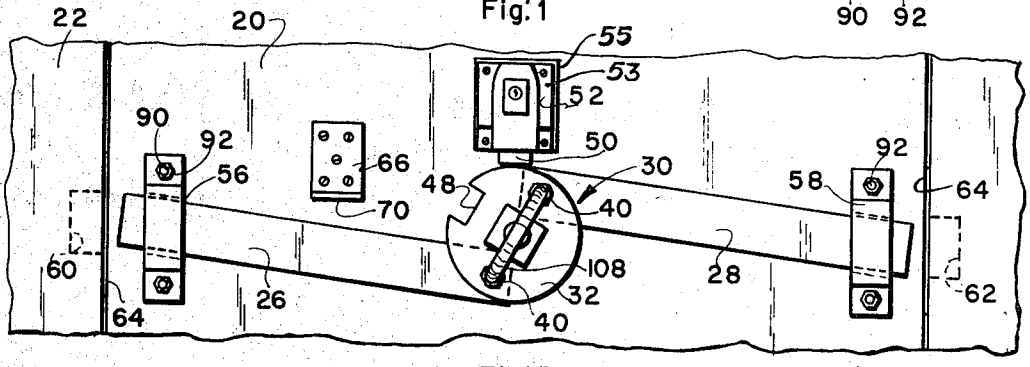



Fig. 2

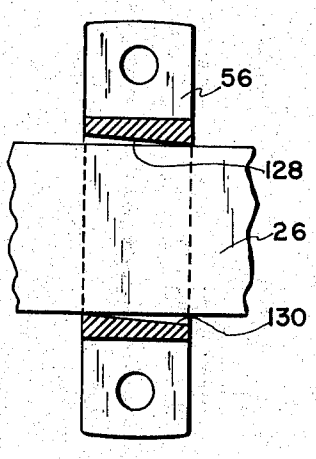



Fig. 4

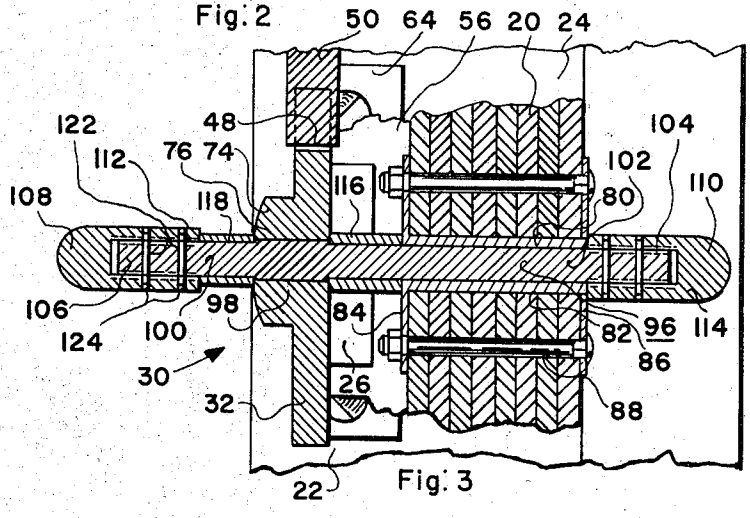



Fig. 3

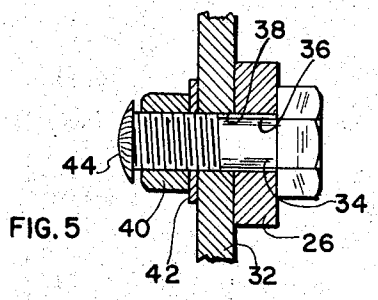



FIG. 5

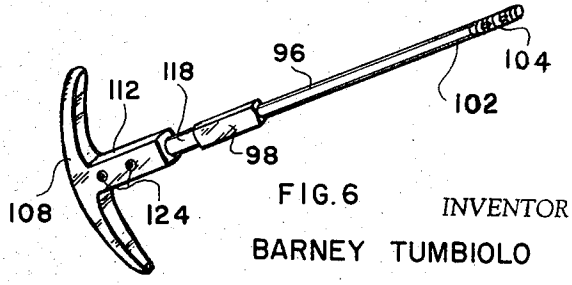



FIG. 6

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SECURITY BAR DOOR LOCK ASSEMBLY

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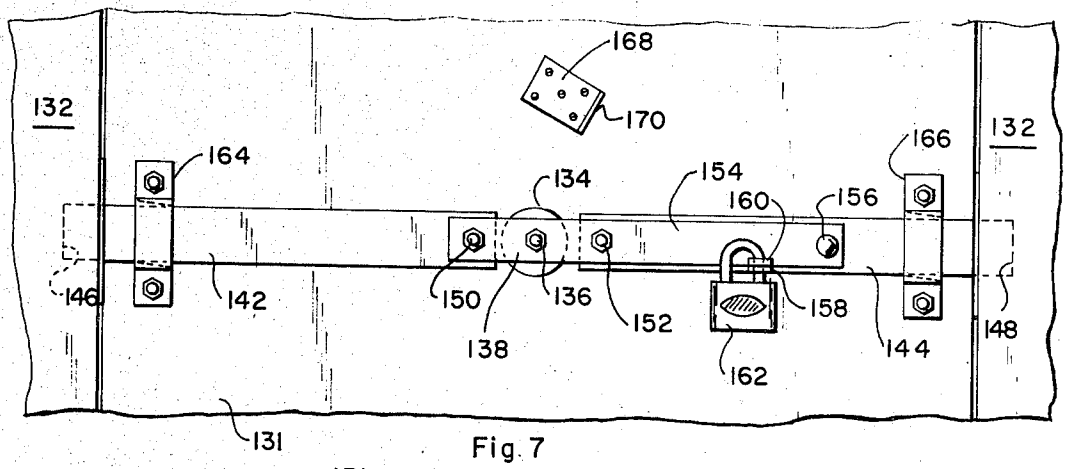



Fig. 7

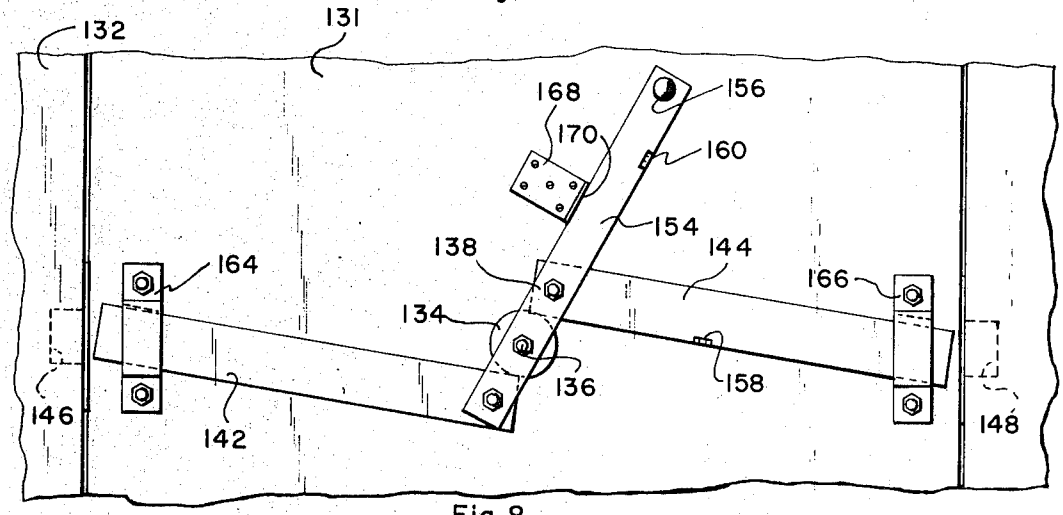



Fig. 8

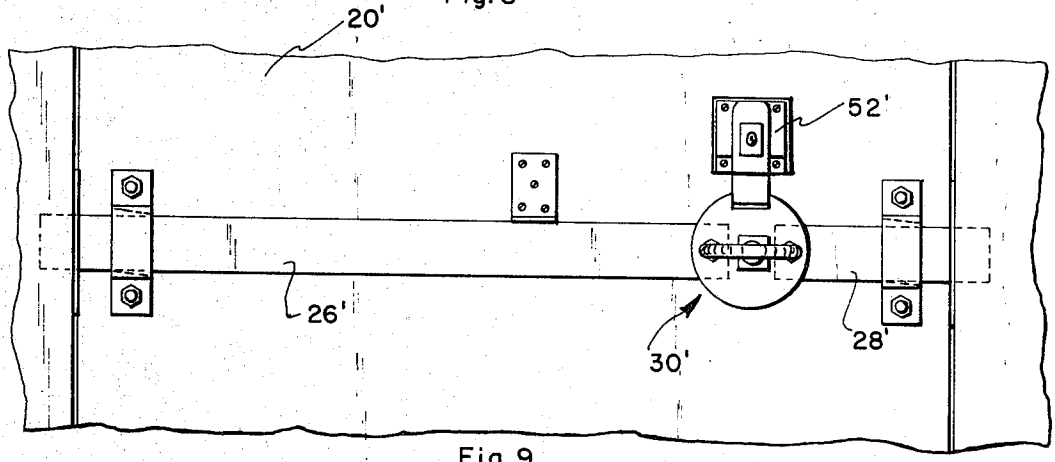



Fig. 9

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3,527,069

# SECURITY BAR DOOR LOCK ASSEMBLY

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Int. Cl. E05b 59/00; E05c 1/00
U.S. Cl. 70—114 7 Claims


## ABSTRACT OF THE DISCLOSURE

A heavy duty security lock assembly includes two heavy steel bars, pivotally interconnected at adjacent ends by a connector piece, extending horizontally across the inner surface of a heavy duty warehouse door. The bars are slid into sockets in reinforced door frame jambs. The two bars pass through guide brackets near the edges of the door. A handle secured on the interconnecting link can rotate the link and withdraw the two steel bars from their sockets to unlock the door. One embodiment has an inside-outside double cylinder key operated deadlock, the deadbolt of which cooperates with a locking recess in the interconnecting link to prevent withdrawing the lock bars. The handle unit extends through the door and has interior and exterior handles. Another embodiment with inside control only, has a handle formed integral with the interconnecting link and parts of one of the lock bars and of the link enables locking by means of a padlock.


## BACKGROUND OF THE INVENTION

The present invention relates to security bar door locks in which heavy duty steel bars are placed across the inside of industrial or warehouse doors and cooperate with sockets made directly in the frame jamb to provide a strong cross bar arrangement across the inside surface of any door preventing inward opening of that door. Such security bar locks are intended to provide maximum security from unauthorized entry to a room or warehouse which they protect.

Many security locks have been previously proposed, yet they are susceptible to one or more kinds of burglarizing. Those which offer the maximum security are often quite difficult to install and maintain. For example, one such prior art bar lock uses gears and gear racks to operate the sliding bars but these components are susceptible to malfunctions because of the close tolerances required by the gear teeth. Malfunctions require locksmiths to make repeated return trips to correct deficiencies and assure operation, which costs either the customer or the locksmith money. Also, there have been numerous instances of break-ins where a thief gains access through one door and then can operate the gear type lock from the inside. Furthermore, the bar material used in the gear type lock is usually not too heavy, a practice followed to keep the cost of gear cutting to a minimum. Furthermore, if the gear type lock is turned too far, the gears go out of synchronization rendering the device inoperable and requiring the service of a locksmith in order to again lock the warehouse door.

Many of other types of previously known security locks have a serious disadvantage in that the handle assembly can be readily disassembled from the interior merely by the use of a pair of pliers. Once the handle is removed the entire lock bars and interconnecting pieces can be disassembled and the door bar lock arrangement destroyed.

Prior to the present invention there has been an unsatisfied demand by locksmiths for a simple kinematic arrangement of a security bar lock assembly which would incorporate simplicity of installation and maintainence, yet provide a high operational and security reliability for the user.



## SUMMARY OF THE INVENTION

Accordingly, a primary object of the present invention resides in the provision of a novel security bar lock for doors, the lock arrangement having a minimum number of simple free moving components.

A further object of the present invention resides in the provision of a door bar lock giving maximum security from the inside as well as the outside of the door.

A still further object of the present invention is to provide a security bar lock arrangement wherein the bars when in the locked condition are unaffected by complete removal of the operating handle assembly from the lockable link which controllably interconnects the lock bars.

Still another object resides in the provision of a novel operating assembly for multiple sliding lock bars including a sleeve unit mounted through a door with a lock bar control handle shaft rotatable in the sleeve. The shaft has a square shaft section located on the inside of the door to cooperate with and carry a bar operating cam plate which has a square central aperture therethrough mating with the square shaft. A handle is secured on each end of the shaft and maintains the cam plate on the shaft and the shaft on the door. A recess in the cam plate is adapted to receive a deadbolt of an adjacent key operated deadlock, the cam plate has provision enabling pivotal coupling to the ends of the sliding lock bars.

Another object resides in the provision of the above described operating assembly in combination with a door and door frame, at least two substantially coextensive sliding lock bars disposed parallel to the inside of the door, a guide bracket for each lock bar fastened on said door and embracing each lock bar near opposite edges of the door. The cam plate is pivotally connected by peened over bolt assemblies to adjacent ends of the two lock bars, the cam plate can be rotated to slide the bars inwardly from the opposite door edges and outwardly beyond the door edges into associated sockets in the door frame, and a key operated lock secured on the door is adapted to engage the cam plate recess and prevent rotation of the cam plate when the bars are disposed in the sockets. The lock, cam plate and bars constitute an effective coextensive security bar extending from socket to socket and maintained in such coextensive relationship by cooperation between each bar, its guide means and its associated socket irrespective of the presence or destruction of the handle shaft pivotally mounting the cam plate to the door.

These and further objects and advantages of the invention will become more apparent upon reference to the following specification, claims and appended drawings.

## BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a detail elevation view illustrating a section of a storage warehouse door and frame, and includes a preferred security bar lock arrangement in accordance with the present invention, the assembly being shown in a locked condition and having inside-outside control;

FIG. 2 is an elevation view similar to FIG. 1 but with the security bar lock assembly in its unlocked condition;

FIG. 3 is an enlarged section view taken on line 3—3 of FIG. 1 and illustrates details of the handle, square shaft and cam and their mounting relationship with the door;

FIG. 4 is an enlarged sectional detail of one of the special guide brackets for the lock bars;

FIG. 5 is an enlarged detail section view of a bolt assembly connecting a shiftable lock bar with the operating cam plate;

FIG. 6 is a perspective view of the handle shaft and one of the two handles fastened on the shaft;

FIGS. 7 and 8 are detail elevation views showing sec-

tions of a door such as in FIG. 1, but illustrating locked and unlocked conditions of a modified lever form of security bar lock having only an inside control; and

FIG. 9 is a detail elevation view of a modified installation of the dual control security bar lock shown in FIG. 1, the shifting bars being of different lengths and enabling an offset installation of the key operated cylinder dead latch and the control cam.

## GENERAL DESCRIPTION

The present invention of course uses simple rugged linkage, all parts are free moving without requiring close tolerances. Even so, many of the parts of the handle operating assembly of the inside-outside control modification are machined precision parts. The deadlock which is a part of one embodiment of this invention is a standard dual cylinder deadlock readily available on the open market. Other than the key operated locks, either a cylinder type deadlock or a padlock, the basic security latch consists of three major pieces, the two heavy duty steel lock bars which extend into sockets formed in the heavy door frames usually associated with the industrial doors to which such security locks are applied, and an interconnecting heavy duty piece which pivotally links the adjacent ends of the two lock bars by means of heavy steel bolts. The interconnecting link is pivotally mounted to the door to enable sliding of the lock bars to locked and unlocked condition. However, whenever the interconnecting link is locked in the latched position, it is immaterial whether the pivot connection to the door is present or not. By using heavy duty bolt connections with peened over ends, disassembly of the three bar lock pieces is prevented. Accordingly, regardless of whether a burglar destroys the handle shaft assembly from exterior or interior of the door it will be virtually impossible, outside of major destruction of the security latch components or of the door, for the latch bar assembly to be removed from its coextensive condition on the interior side of the door.

Referring generally to FIGS. 1 and 2, and specifically to FIGS. 3–5, the preferred arrangement and installation of a double cylinder security bar lock with inside and outside control will be described, the FIGS. 1 and 2 respectively illustrating the locked and unlocked conditions.

The lock assembly was primarily developed for heavy duty industrial use and is mounted directly on a door **20** normally hung in a steel or reinforced concrete frame **22**. The lock assembly is particularly adaptable to heavy duty industrial doors known as calimine (laminated metal) but it can be just as suitably mounted on solid core doors, often sheathed with sheet metal, having a high degree of resistance to breaking and entering. The frame **22** of such an industrial door is constructed with a wide jamb portion **24**, seen in FIG. 3, often being made from heavy angle iron, approximately one quarter inch thick. Such jamb and frame can be constructed as a portion of a reinforced concrete wall. Door **20** is hinged at either side by heavy industrial hinges recessed in a known manner (not shown) to prevent disassembly of the hinge when the door is closed. The present invention utilizes the wide jamb to provide keeper sockets necessary for receiving the ends of two heavy steel, shiftable lock bars **26** and **28**.

One acceptable installation has utilized bars which are one-half inch thick and two inches wide, made from cold rolled steel bar stock.

A handle assembly **30** is rotatably mounted on the door **20**, with its shaft extending through the door and nonrotatably carrying an operating cam plate **32**. Each of the two bars **26** and **28** are pivotably secured at one of their ends to cam plate **32** by steel bolts **34** which pass through an aperture **36** in one end of a respective bar **26** or **28** and a matching aperture **38** in the cam plate **32** adjacent its outer edge. A nut **40** and washer **42** on the end bolt **34** secure the bar **26** to the cam plate **32**.



The connection is made substantially permanent to prevent undesired tampering with the nut and bolt by peening over the end **44** of bolt **34**, FIG. 5.

The periphery of cam plate **32** has a notch (or recess) **48** to receive the dead bolt **50** of an inside-outside, key operated controlled, double cylinder dead latch **52**. Such dead latches **52** are commercially available and will not be further described. Between the dead latch body **53** and door **20**, a flat wood or metal spacer block **55** is used to properly position the bolt **50** for its cooperation with cam plate recess **48**. The screws **54** which fasten the dead latch **52** and spacer block **55** to door **20** are preferably the kind which have one way kerfs, permitting the screws to be screwed into the door but preventing their removal in the reverse direction. For security purposes, it is preferable that such one way screws be used wherever screws are described in this specification.

The handle assembly **30**, being pivotally mounted on the door **20** and having the bars **26** and **28** pivotally coupled thereto by bolts **34** will rigidly support the coupled adjacent ends of the lock bars **26** and **28**. Near the side edges of door **20**, the two bars **26** and **28** pass through slot apertures in respective bar guides **56** and **58**. The width of the guide slots is such as to provide a close but free sliding fit for the lock bars. In the locked position of the handle **30** (FIG. 1) the two bars are coextensive and aligned horizontally and the respective lock bars **26** and **28** have been slid outwardly so their outer ends are disposed in keeper sockets **60** and **62**, cut by suitable means, such as a cutting torch, in the door jambs. If desired, for appearance sake, small socket cover plates **64** can be fastened over the door jamb sockets **60** and **62**, and also have slots the width of which provides a close but free sliding fit for the lock bars. A piece of angle iron, serves as a stop bracket **66** fastened by screws **68** to door **20** in a position where its lower flange **70** is abutted by the upper edge of the lock bar **26** when the bars have been slid into the sockets, as shown in FIG. 1.

The cam plate **32** as well as the guide brackets **56** and **58** are metal castings, for example, iron or some lightweight strength aluminum alloy such as Tenzaloy or aluminum casting alloy #356. Cam plate **32** is made with a heavy central embossment **74** and is centrally apertured with a square hole **77**. The plate portion of cam **32**, in a heavy duty installation, is approximately ½" thick and provides a heavy duty lock bar interconnecting link as well as a lockable bar operating member.

FIG. 3 shows detail components of the handle assembly **30**. Although the assembled handle mechanism **30** is made as tamper proof as possible, the security lock bars and the linking cam when locked, will be maintained in the locked position even if the handle shaft is broken and the shaft forced out of the door and away from its assembly with the cam plate **32**. Viewing FIGS. 1 and 4, it will be seen that bar **26** is recessed at its left end in its associated door frame socket **60** and is also in guided disposition in the guide bracket **56** as well as being secured at its right end by a bolt **34** and nut **40** to the connecting cam plate **32**. The opposite side of cam plate **32** is secured to the left end of lock bar **28** by its bolt and nut assembly and the right hand end of lock bar **28** is in guided disposition in the slot of its guide bracket **58** and has its right hand end disposed in the door frame socket **62**. So disposed, the bars **26** or **28** cannot be shifted toward or away from the door or up or down excepting for a slight shift permitted by tolerance clearance in the guide brackets and sockets. Being joined to cam plate **32**, as an effective connector link, lock bars **26** and **28** cannot be shifted toward each other out of their sockets as long as the cam plate **32** is retained essentially in the position shown in FIG. 1. The only way the bars **26** and **28** can be displaced up or down or slid back out of their sockets, with a commensurate up and down inclination, is to rotate cam plate **32**. However, cam plate **32** cannot be rotated as

long as its notch or recess **48** is engaged by the dead bolt **50**. Thus, even if the handle shaft were removed from cam plate **32**, the bars **26** and **28** remain in co-extensive relationship and the cam plate cannot drop down or be shifted toward or away from the door out of engagement with the dead bolt **50**. Therefore, the security bar latch lock bars will remain in the door locked condition. This condition cannot be destroyed because the bolted connections of lock bars **26** and **28** to the cam plate **32** cannot be disassembled without substantial major destruction to the connecting bolts **34**.

The handle assembly **30** is fastened in a rotatable manner on the door by using components as will now be described. A template or jig (not shown) is used to locate on the inside of a door, the center point for a handle shaft hole **80** as well as center points for the dead lock mounting screws **54** and the dead lock cylinder access hole and appropriate holes drilled through the door. A flanged sleeve **82** is inserted into hole **80** from the interior side of the door so its flange **84** rests against the inner surface of door **20**. An apertured clamping plate **86** is spigoted over the end of the flange sleeve **82** and disposed against the outer side of door **20**. This arrangement permits use of a standard flange sleeve regardless of the door thickness. Suitable bolt holes are drilled through door **20** and carriage bolts **88** with square head shanks forced through suitable holes in the outside plate **86** with the bolt shaft passing through the door **20** and the matching holes in the flange sleeve **84**. Appropriate nuts and lock washers are fastened to the ends of bolts **88**. Carriage bolts **88** inhibit undesired tampering from the exterior and if desired, the inner ends of bolts **88** may be peened over to prevent removal of the nuts from the interior side.

Using hole **80** as a location position, the sockets **60** and **62** are cut or otherwise made in the jambs of the door frames in horizontal disposition with the handle hole **80**. The two brackets **56** and **58** can be appropriately located by templates and secured by bolts **90** and nut **92**. Here also, the ends of the bolts are peened over to prevent removal of the nuts. The lock bars **26** and **28**, secured together with the connecting cam plate **32**, are then worked into the slots of the respective guide brackets **56** and **58** and the cam plate **32** raised to the position shown in FIG. 2, aligning its square center hole **76** with the installed flange sleeve **82**. The handle shaft **96** can then be installed from the interior side.

Handle shaft **96**, shown in FIGS. 3 and 6, is machined from steel bar stock and has a square cross-section portion **98** near one of its ends. The round shaft portions extending from each end of the square portion **98** are machined to their cylindrical shape and one section **100** is shorter than the other section **102**. The longer round section **102** extends through the sleeve **82** in the door and terminates in a threaded end **104** projecting beyond the exterior of the door and the shorter round shaft section **100** has a threaded end **106** projecting from the cam plate. Handles **108** and **110**, which can be cast from aluminum alloy, has internally threaded shanks **112** and **114** and, after the shaft is inserted from the interior side through the square cam plate hole **76**, through a spacer sleeve **116** and the flanged sleeve **82**, are screwed on to the respective ends **106** and **114** of the handle shaft.

A second spacer sleeve **118** can be located between the inside handle **108** and the enlarged portion **74** of cam plate **32**. By variations in the length of the two spacer sleeves **116** and **118**, the cam plate **32** can be spaced the requisite distance away from the inside surface of door **20** to permit disposition of the heavy lock bars **26** and **28** between the cam plate and the door, to prevent binding between the cam plate and the bars, and to permit full threaded connection of the interior exterior handles **108** and **110** to the respective threaded ends regardless of the thickness of the door **20**.

After the handles are assembled, as has been described, suitably drilled cross bores **120** through the handle shank and the threaded ends of the handle shaft receive lock pins, e.g., steel roll pins **124** to lock the threaded handle pieces onto the shaft **96**. Pins **124**, being slightly shorter than the cross bores, permits the ends of the bores to be plugged with lead or aluminum and smoothed over, after which the entire handle portion is painted to obliterate evidence that such lock pins are in place.

Turning now to FIG. 4, a vertical section through guide bracket **56** shows that the guide slot is cut on an inclined path shown by surfaces **128** and **130**. Thus when each of the latch bars **26** or **28** is horizontal, the locked position, and disposed in its frame sockets **60** the lower surface of lock bar **26** rests on the highest point of the slanted guide surface **130** and the upper surface of lock bar **26** is closely adjacent the lower point of the upper guide surface **128**. This enclosed guide slot relationship together with the disposition of the end of lock bar **26** with a rather close fit in its socket **60** will essentially prevent up and down movement of the lock bar **26** in its socket **60** as well as preventing movement toward and away from the door. Nevertheless, when the dead bolt **50** is removed from locking cooperation in cam plate recess **48** and the cam plate rotated counterclockwise as shown in FIG. 2, the two lock bars **26** and **28** are readily slid back out of their respective sockets and along the guide path slots in the guide brackets **56** and and **58**. As the bars move further out of locking disposition, their adjacent ends coupled to cam plate **32**, are moved away from the horizontal disposition, in other words, the right hand end of lock bar **26** moves downwardly as the bar is pulled out of its socket. The inclined surfaces **128** and **130** of the guide brackets **56**, as well as of guide bracket **58**, permit this canted disposition of the two lock bars **26** and **28** as they are withdrawn to a fully retracted disposition. As the bars are fully retracted, their coupled ends move into engagement with spacer sleeve **116** which limits the retracted position to that shown in FIG. 2.

When the lock assembly **20**, **26**, and **28** is in retracted position shown in FIG. 2, the door may be opened and closed. In this condition the dead bolt **50** is retracted, and can only be extended to a lock condition when the door is swung shut and the cam plate **32** rotated to the position shown in FIG. 1. Moreover, the dead bolt can only be extended by deliberate key operated action from either of the inside or the outside key operated cylinders. When the door is locked from either inside or outside, rotation of the outer handle **110** and cam plate **32** into the proper disposition of cam recess **48** directly below and aligned with the dead bolt **50** will be determined by the abutment of lock bar **26** against the stop flange **70**. This limit stop **70** or some other suitable stop pin or abutment arrangement prevents the cam plate **32** from being rotated to a position where its recess **48** would pass beyond alignment with the dead bolt **50**, and thereafter cause reverse movement or withdrawal of the latch bars from their sockets.

## OFFSET INSIDE-OUTSIDE SECURITY BAR LATCH

FIG. 9 illustrates an assembly substantially identical with that shown in FIGS. 1 and 2 excepting that the handle assembly **30'** and the dead bolt **52'** are fastened in an offset arrangement toward one side of the door **20'**. Other than the offset mounting, this assembled variation from the preferred embodiment is accomplished merely by making bar **26'** longer than bar **28'**, all other components of the FIG. 9 installation being identical to those described for the FIG. 1 installation.

## INSIDE CONTROL MODIFICATION

In some warehouse and storage compartment locations, it is not desired that the door be unlocked from the outside. In these cases, a less expensive installation, such as shown in FIGS. 7 and 8, can be utilized. As described for FIG. 1, this installation is also made on a heavy duty

door **131** hinged within the wide jamb of a heavy duty door frame **132**. A flanged sleeve **134** with an external flange plate (not shown) similar to components **80** and **86** shown in FIG. 3, is installed through and fastened to the door **131**. A large steel pivot bolt **136** is passed through the door from the exterior side and thence through an aperature in a control bar **138** coupled to the latch bars. A suitable spacer sleeve similar to spacer **116** in FIG. 3, can be placed on the bolt **136** between the connector bar **138** and the flange sleeve **134**, if desired. A nut is threaded onto the end of bolt **136** and secures the connecting bar **138** on the pivot bolt **136**.

The end of bolt **136**, as has been hereinbefore described for the bolts in the previous embodiment, is peened over to prevent undesired removal of nut **130**. However, as is true of the FIG. 1 embodiment, and as will become apparent, even if the mounting pivot bolt **136** should be sheared off by a burglar operating from inside the building, the arrangement of the two lock bars **142** and **144** locked together with the interconnecting bar **138** maintains the three pieces in coextensive rigid locked disposition with the ends of the locked bars **142** and **144** disposed in sockets **146** and **148** cut into the side walls of the wide jambs of frames **132**. The lock bars **142** and **144** are made of heavy steel bars, as has been described for FIG. 1, and the interconnecting connector bar **138** is made from similar bar stock. Connector bar **138** is secured to the adjacent ends of the two lock bars **142** and **144** by heavy steel bolts and nuts **150** and **152**, similar to the interconnection of the two lock bars **26** and **27** and cam plate **32** shown in FIG. 1. The protruding ends of the bolts in the two bolt assemblies **150** and **152** are peened over for reasons previously described. One end **154** of the interconnecting bar **138** extends beyond the bolted pivot connection to and parallel with the front surface of lock bar **144** and has an operating knob **156** secured at its free end. This arrangement constitutes an operating handle.

An apertured lug **158** welded to the lower edge of lock bar **144** and a matching apertured lug **160** welded to the lower edge of the interconnecting handle bar **154** provide a means whereby a padlock **162** can be used to fasten the interconnecting handle bar **154** horizontally in front of and to the one lock bar **144**. The padlock locks all three bars together with the ends of the two lock bars **142** and **144** disposed into the sockets in the jambs of door frame **132**. This arrangement effectively provides a single rigid bar extending across the inside face of the door and into sockets in the jambs of the door frame and constitutes a positive barred closure of door **130** which cannot be removed without unlocking the lock, outside of major destruction of the simple latch bar linkage. This inside controlled latch bar arrangement, uses guide brackets **164** and **166** which are made from cast metal and are fastened to the door in a manner similar to that described for the FIG. 1 embodiment.

When padlock **162** is removed, the handle bar portion **154** can be swung up about pivot bolt **136** to a position shown in FIG. 8. This rotation of the connector bar **138** will cause the two lock bars **142** and **144** to slide out of their respective sockets **146** and **148**, unlocking the door. To prevent swinging the handle or connector bar **154** so far as to completely slide the lock bars **142** and **144** out from the guide slots in their respective guide brackets **164** and **166**, an angle bracket **168** with stop flange **170** is provided as shown in FIG. 8 to limit the rotation of bar **154**.

What is claimed and desired to be secured by Letters Patent is:

**1**. In combination with a door and door frame with lock bar sockets, a heavy duty security lock assembly comprising: two substantially co-extensive sliding lock bars made from rigid steel bars disposed parallel to said door on the side toward which the door moves to a door open condition; guide means for each lock bar embracing, in a close sliding fit, top and bottom edges and front and back sides of each of said lock bars mounted on said door near opposite edges of said door; a heavy duty rigid metal interconnector link comprising a cam plate with a non-circular aperture therethrough; at least two coupling means pivotally connecting said link with adjacent ends of said two lock bars; means pivotally securing said link to said door intermediate said adjacent ends of said two lock bars comprising sleeve means adapted to be mounted to extend through said door, a rotatable handle shaft having one end section rotatably disposed through said sleeve means and a non-circular shaft section disposed on the side of the door carrying said sliding lock bars, projecting through and mating with said cam plate aperture rendering said shaft and cam plate relatively non-rotatable, whereby said link can be rotated to slide said bars inwardly from the opposite door edges, and outwardly beyond said door edges and into associated sockets formed in said door frame, said sockets having a close sliding fit with the ends of said bars, a handle for and secured on each end of said shaft to maintain said shaft on said door and connected to said cam plate; key operated lock means comprising a deadbolt assembly secured on said door adjacent and adapted to engage said link and prevent rotation of said link when said link is disposed in position to place said bars in said sockets; and said cam plate has a recess for receiving the bolt of said lock means; said lock means, said link and said bars when in locked condition constituting an effective co-extensive rigid security bar extending from socket to socket and maintained in such co-extensive rigid relationship against up and down, fore and aft and end to end displacement by cooperation between each said bar, its guide means and its associated said socket irrespective of the presence of the means pivotally securing said link to said door.

**2**. A security lock and door assembly as defined in claim **1**, wherein the ends of said shaft are screw threaded and said handles are screwed on said shaft ends.

**3**. A security lock and door assembly as defined in claim **1**, wherein a spacer sleeve disposed on said shaft between said square shaft-section and said sleeve means maintains said cam plate and said lock bars spaced away from said door.

**4**. A security lock and door assembly as defined in claim **1**, wherein said cam plate and said guide means are heavy duty castings with said aperture in said cam plate formed as a square hole and said non-circular shaft section has a square cross section.

**5**. A door lock operating assembly as defined in claim **1**, wherein the ends of said shaft are screw threaded and said handles are screwed on said shaft ends and hidden pin means non-rotatably lock said handles on said shaft.

**6**. A door lock operating assembly as defined in claim **1**, wherein said provision in said cam plate for pivotally coupling to sliding bars are oppositely located holes, threaded bolt and nut assemblies couple a lock bar to each hole, and the threaded bolt in each bolt and nut assembly has its end peened over to prevent removal of its associated nut.

**7**. In combination with a door and door frame with lock bar sockets, a heavy duty security lock assembly comprising: two substantiallly co-extensive sliding lock bars made from rigid steel bars disposed parallel to said door on the side toward which the door moves to a door open condition; guide means for each lock bar embracing, in a close sliding fit, top and bottom edges and front and back sides of each of said lock bars mounted on said door near opposite edges of said door; a heavy duty rigid metal interconnector link; at least two coupling means pivotally connecting said link with adjacent ends of said two lock bars; means pivotally securing said link to said door intermediate said adja-

cent ends of said two lock bars whereby said link can be rotated to slide said bars inwardly from the opposite door edges, and outwardly beyond said door edges and into associated sockets formed in said door frame, said sockets having a close sliding fit with the ends of said bars; key operated lock means comprising a padlock adapted to engage said link and prevent rotation of said link when said link is disposed in position to place said bars in said sockets; said lock means, said link and said bars when in locked condition constituting an effective co-extensive rigid security bar extending from socket to socket and maintained in such co-extensive rigid relationship against up and down, fore and aft and end to end displacement by cooperation between each said bar, its guide means and its associated said socket irrespective of the presence of the means pivotally securing said link to said door; said link comprising a bar with integral handle section extending beyond one of said coupling means; matching apertured lugs are provided on said handle section and on one of said lock bars enabling locking of said two lugs together by said padlock to secure alignment of said handle section with



both of said lock bars and thereby maintain said lock bars in a door locked condition.

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