United States Patent [19]

Pastva, Jr.

[11] **3,737,183**

[45] **June 5, 1973**

[54] DOOR LOCK

[75] Inventor: **John V. Pastva, Jr.**, Parma Heights, Ohio

[73] Assignee: **The Eastern Company**, Cleveland, Ohio

[22] Filed: **May 20, 1971**

[21] Appl. No.: **145,279**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 19,867, March 16, 1970, Pat. No. 3,695,661.

[52] **U.S. Cl.** **292/7**, 292/218

[51] **Int. Cl.** **E05c 7/04**

[58] **Field of Search** ..... 292/218, 109, 110, 292/116, 6, 7, 11, 111, 65, DIG. 46, DIG. 49

[56] **References Cited**

UNITED STATES PATENTS

2,038,876	4/1936	Sonabend	292/218
2,378,654	6/1945	Pekny	292/111
3,630,559	12/1971	Rawson et al.	292/113
3,329,456	7/1967	Olander	292/218
3,378,294	4/1968	Olander	292/218

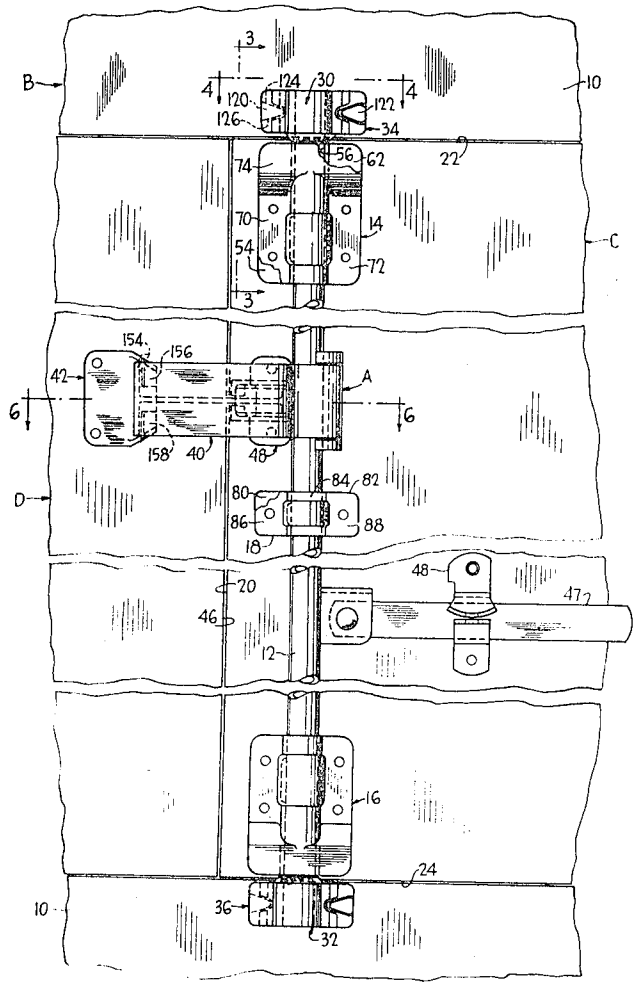
Primary Examiner—Richard E. Moore

Attorney—Watts, Hoffmann, Fisher & Heinke

[57] **ABSTRACT**

A cam-type door lock including latch members on opposite ends of an oscillatable rod attachable to a pivoted door adjacent to the non-pivoted side and engageable with keeper members attachable to the door frame adjacent to opposite side edges of the door to secure the door in closed position and a third lock point intermediate the opposite side edges including a strap or latch member secured to the shaft intermediate its ends engageable with a third keeper member on the adjacent door or door frame to pull the two together and towards closed position. The first mentioned latching members overlie the end of the rod or shaft to which they are attached, are symmetrical about the axis of the rod or shaft and each has oppositely projecting forked cam portions adapted to straddle two spaced post portions of the cooperating keeper members. The post portions of the keeper members have tapered side surfaces engageable by the forked cam portions during latching to assure alignment of the door with the frame and to prevent lateral shifting or distorting of the frame in the plane of the door after latching. One post portion of each of the first mentioned keeper members has projecting flange portions with concave surfaces engageable by the forked cam portions of the associated latch member to retain the door in a closed position.

2 Claims, 6 Drawing Figures



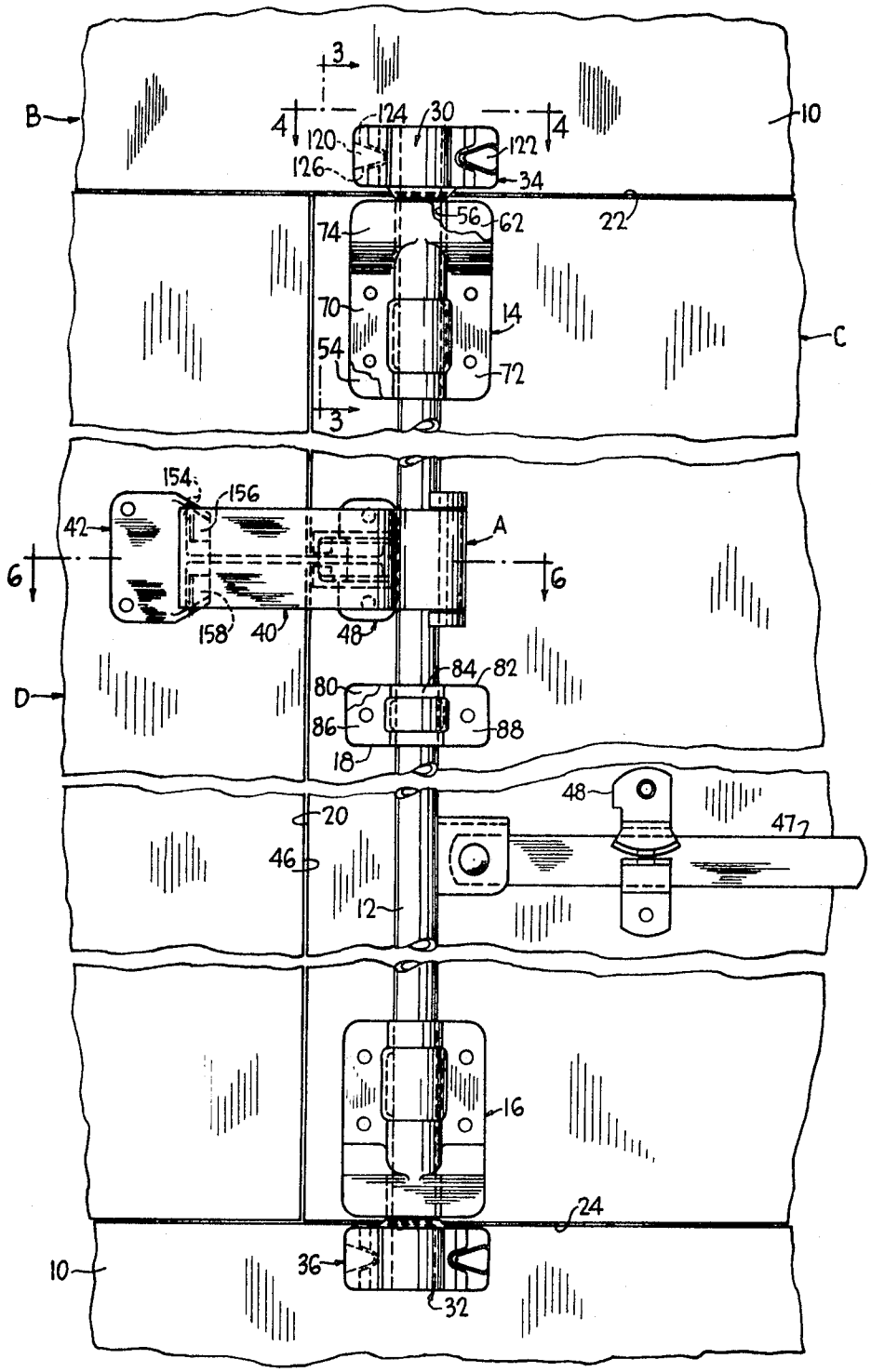


FIG. 1

INVENTOR.
JOHN V. PASTVA, JR.
BY Watts, Hoffmann, Fisher & Heinke
ATTORNEYS

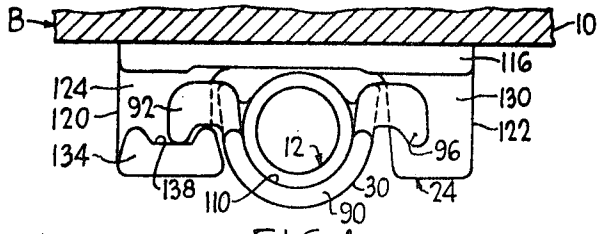


FIG. 4

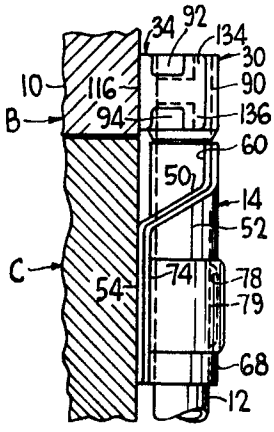


FIG. 3

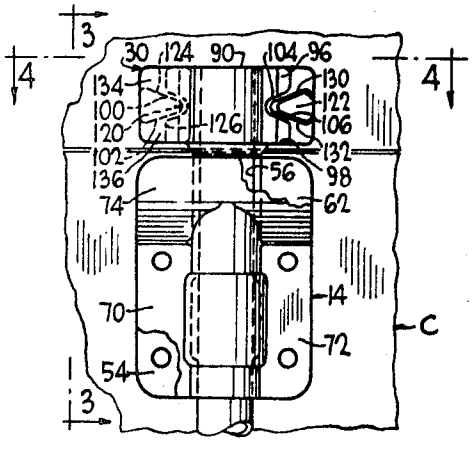


FIG. 2

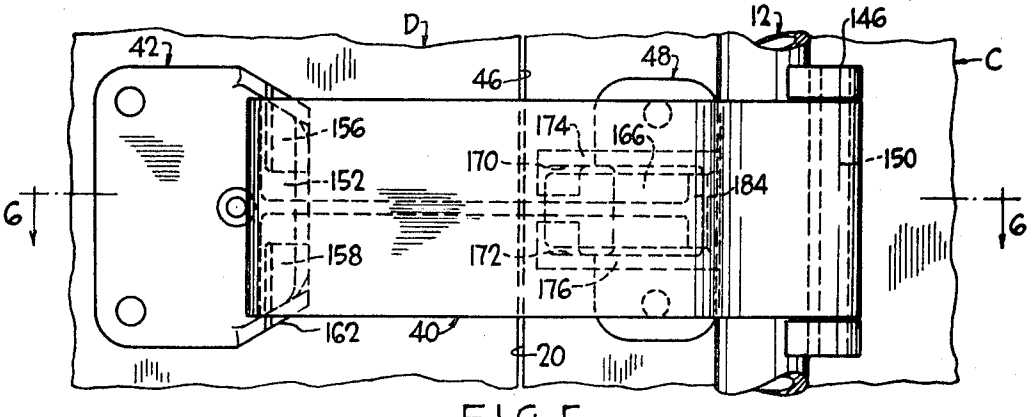


FIG. 5

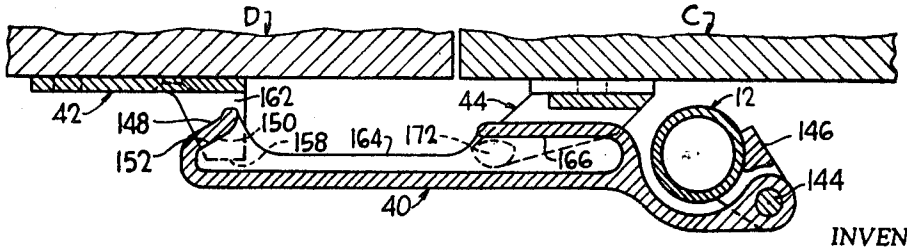


FIG. 6

INVENTOR.
JOHN V. PASTVA, JR.

BY Watts, Hoffmann, Fisher & Heinke
ATTORNEYS

DOOR LOCK

RELATED APPLICATION

This application is a continuation-in-part of my co-pending application, Ser. No. 19,867, filed Mar. 16, 1970, entitled Door Control Mechanism, U.S. Pat. No. 3,695,661 issued Oct. 3, 1972.

FIELD OF INVENTION

This invention relates to door control mechanism of the type used for securing and maintaining pivoted doors, and more particularly, pivoted doors of trucks, trailers and/or large cargo containers, in their associated door frames, and the like.

DESCRIPTION OF THE PRIOR ART

Load carrying compartments such as truck and trailer bodies and transport cargo containers typically utilize pivoted double doors at one end wall to facilitate loading and unloading. Because the door opening is essentially co-extensive with the end wall of the load compartment, cross bracing is lacking and the frame is readily distortable incident to uneven support, etc. Door control mechanisms are used with such doors to retain the doors closed and reduce or eliminate racking, and typically include one or more lock rods extending the height of the door and having latch members at each and engageable with keeper members on the door frame. Some of the latch members have portions extending laterally on opposite sides of the lock rod provided with cam surfaces engageable with cam surfaces of the keeper members. Mechanisms of this type in which latch members are provided with forked portions to assure alignment of a door with the door frame and prevent racking, i.e., transverse distortion of the rectangular door frame are disclosed in my prior U.S. Pat. Nos. 3,099,473 and 3,484,127, over which the present invention constitutes an improvement.

SUMMARY OF THE INVENTION

The invention provides a novel and improved door control mechanism or lock of the cam type which utilizes a number of readily produceable parts and which latches or locks the doors to the door frame at its upper and lower edges and to a second door or frame member at the side opposite the hinge or hinges intermediate the upper and lower edges. The lock is inexpensive to manufacture, and in operation forcibly closes a door and aligns it with its door frame and thereafter maintains alignment and reinforces the door frame.

One of the principal objects of the invention is the provision of a novel and improved door control mechanism comprising a lock rod or shaft to be secured to a door adjacent to the non-hinged side for rotation about an axis parallel to the door hinge, a handle for turning the lock rod about its longitudinal axis, a handle retainer and/or lock, a latch member carried at each opposite end of the lock rod cooperable with keeper members secured to the top and bottom frame members of adjoining structure to which the door is pivoted, a third latch member secured to the lock rod or shaft intermediate its ends cooperable with a third keeper member to secure the door to an adjoining structure such as a second door, cooperable cam surfaces on the latch members and keeper members for forcing the door closed and into alignment with the door frame during latching and thereafter maintaining the door

closed and aligned, etc. The design and construction is such that the door reinforces of cross braces the frame inhibiting distortion, increasing the strength of the assembly, etc.

A further object of the invention is the provision of a novel and improved door control mechanism of the character referred to, having latch members at the ends of an oscillatable shaft or lock rod provided with U-shaped body portions open only the axial length to receive the supporting lock rod and oppositely extending forked portions each having cam surfaces which cooperate with portions of a cooperating keeper so that when the lock rod is turned to latch position one of the forked portions latches the door in a closed position and cam surfaces of both forked portions cooperate with the keeper member to align the door relative to the frame and/or inhibit relative shifting of the door and frame out of alignment in the plane of the door in combination with a third latch member connected to the lock rod intermediate its ends and an associated keeper both having cooperating surfaces assisting in the aligning and closing of the door or doors.

These and other features and advantages of the invention will be better understood from the following description of the preferred embodiment shown in the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a partial elevational view of the back end of a truck having double access flush-type doors equipped with the preferred embodiment of the invention;

FIG. **2** is an enlarged view of a part of FIG. **1**;

FIG. **3** is a sectional view approximately on the line **3—3** of FIG. **2**;

FIG. **4** is a sectional view on the line **4—4** of FIG. **2**;

FIG. **5** is an enlarged view of a part of FIG. **1**; and

FIG. **6** is a sectional view on the line **6—6** of FIG. **5**.

DESCRIPTION OF PREFERRED EMBODIMENT

The preferred door control mechanism, designated generally by the reference character A, is shown applied to a truck body B having rear flush-type double access doors C, D hinged to the door frame **10** of the truck body along opposite vertical side edges.

The door control A includes a shaft or lock rod **12** rotatably supported against axial movement by a plurality of suitable upper and lower bearing members or brackets **14, 16** and one or more intermediate bearing members or brackets **18** along the rear or outer side of the door C adjacent to its free or non-pivoted side edge **20.** The ends of the shaft **20** extend above the upper edge **22** of the door and below the lower edge **24** of the door an have upper and lower latch members **30, 32** fixed thereto which cooperate when the door is being closed and while closed with upper and lower keeper members **34, 36** secured to the door supporting structure or frame **10** in the alignment and closing of the door and the maintenance of the door properly aligned and closed. An intermediate or third latch member **40** having one end eccentrically connected to the shaft **12** intermediate its ends cooperates with an intermediate or third keeper member **42** and a guide member **44** secured to the door D adjacent to the non-pivoted or free side edge **46** thereof for assisting in the aligning and closing of the doors, etc. A handle **47** pivoted to a bracket secured to the lock rod **12** is provided for oscillating the shaft. A handle retainer assembly **48** attached

to the door C is provided for securing the handle in a fixed position relative to the door C.

The upper and lower bearing members **14, 16** are secured to the door B adjacent to its upper and lower edges **22, 24** respectively, are identical in construction and only the upper bearing member **14** will be described. The bearing member **14** is formed of a back plate **50** and a cover plate **52.** Both plates are metal stampings, suitably of cold rolled steel, are generally rectangular in plan and are constructed to nest with one another to form a tubular passageway for the lock rod **12.** The back plate **50** has a relatively large, flat portion **54** and at one end and adjacent to the other end a short, partial cylindrical cavity or channel **56,** bounded along two opposite sides by extending flange portions **60, 62** that in part cross the axis of the cavity **56** and in part extend parallel to the flat portion **54** in a plane spaced therefrom by the diameter of the lock rod **12.**

The cover plate **52** which is complementary in shape to the bottom plate **50** has a relatively long longitudinal cavity or channel **64** extending in alignment with the cavity **68** of the back plate and longitudinal flange portions **70, 72** on opposite sides of the cavity **68** which lie against the flat portion **54** of the back plate and extend in part across the depth of the cavity to merge with flat portions **74, 76** of the cover plate that lies against the external flange portions **60, 62** of the back plate **50.** The bottom of the channel **56** in the back plate **50** is spaced slightly above the flat portion **54** and the cover plate **52,** as shown, has an internal circumferential depression **78** in the channel portion **68** thereof to accommodate a ring or band-like member **79** fixed to the rod **12** and which prevents or assists in preventing axial movement of the lock rod **12** in the bearing member or bracket **14.** The lock rod, however, is free to rotate or turn about its longitudinal axis.

The intermediate bearing brackets **18** each comprise a back plate **80** located between the lock rod **12** and the door C and a cover plate **82** having a U-shaped central portion **84** and two extending flange portions **86, 88.** The cover plate extends over the lock rod **12** and together with the back plate is secured to the door C by suitable fasteners. The plates of the intermediate bearing brackets **18** are metal stampings, suitably of cold rolled steel.

The handle **47,** for rotating the lock rod **12,** is an elongated, flat, metal member pivoted at one end by a pin **90** to a channel-shaped member **92** welded at one end to the lock rod **12** with its open side facing upwardly to allow substantial pivoting of the handle about the pin **90** in an upwardly direction while permitting merely limiting pivoting of the handle in the opposite direction. The handle can be moved in a vertical plane to release it from the assembly **48,** without moving the lock rod **12.** Movement of the handle toward or away from the door C will turn the lock rod **12** about its longitudinal axis.

The latch members **30, 32** overlie and are fixed as by welding to the ends of the lock rod **12** projecting beyond the upper and lower bearing members **14, 16,** respectively. The latch members **30, 32** are identical in construction and are made symmetrical about a central vertical plane and only the latch member **30** will be described. The corresponding parts of the latch member **32** will be designated by the same reference characters with a prime mark affixed thereto.

The latch member **30** is a metal forging welded to the upper end of the rod **12** and includes a central U-shaped body portion **90** and two forked portions extending in opposite directions toward the left and right from the central body portion and comprising fork projections or tines **92, 94** and **96, 98** formed by V-shaped grooves providing cam surfaces **100, 102** and **104, 106,** respectively, converging towards the body portion. In the preferred embodiment, the lock rod **12** is cylindrical and the central body portion **90** of the latch member is in the form of a section of a circular cylinder forming a recess or channel **110** adapted to receive the end of the rod **12.** The central body portion extends axially in the direction of the adjacent bearing member beyond the forked portion to form a semi-circular boss for engagement with the end of the bearing bracket adjacent thereto. The tines or fork projections **92, 94, 96** and **98** are curved in a direction away from that in which the axial opening **110** faces and end in cam surfaces which terminate in a common plane that intersects the central body portion **90.** The curvature of the fork projections is insufficient to produce a re-entrant angle.

The keeper members **34, 36** are identical to each other and only the keeper member **34** will be described. The corresponding parts of keeper member **36** are identified by the same reference characters with a prime mark affixed thereto.

The keeper member **34** includes a relatively flat base portion **116** provided with apertures for attachment with fasteners to the door frame **10** in alignment with and directly opposite the associated latch member **30.** Two spaced posts or post portions **120, 122** extend outwardly from the base portion adjacent opposite left and right-hand ends thereof in position to be straddled by the fork portions **92, 94** and **96, 98,** respectively, of the associated latch member **30** as it is pivoted by rotation of the lock rod **12.** The post **120** has opposite side cam surfaces **124, 126** perpendicular to the base portion and which converge toward each other in the direction of the opposite post portion **122.** The post portion **122** has opposite side cam surfaces **130, 132** that converge toward one another in the direction of the post portion **120** and which also slope or converge toward one another in an outward direction from the base portion **116** so that the post portion **120** tapers outwardly.

The side cam surfaces **100, 102** and **104, 106** of the latch member **30** are adapted to cooperate with the cam surfaces **124, 126** and **130, 132,** respectively, of the keeper member **34** to assure alignment of the door C in the door frame **10** as it is being closed and/or maintain the alignment after being closed. With the door so restrained against movement, the door becomes a structural reinforcing member for the truck body B and adds rigidity to the entire assembly.

The end of the post portion **120** of the keeper member opposite the base **116** is provided with projecting latch retaining flanges **134, 136** spaced from the base and against the under or rear sides of which the radially outwardly portions of the cam surfaces of the tines **92, 94** of the latch member **30** engage upon rotation of the lock rod with the door closed to firmly draw the door closed and maintain it in a closed position. The flanges **134, 136** are spaced from the base portion **116** a distance sufficient to receive the projections **92, 94** of the latch member **30,** yet close enough to the base portion to hold the door C tightly closed and preferably close

enough to interfere or limit free rotation of the lock rod **12** before the handle **46** is against the door so that a slight torsion loading can be applied to the lock rod **12** by the handle **46** when the handle is forced into a position where it is retained by the assembly **48.** In the preferred embodiment shown, the rear sides of the flanges **134, 136** are provided with concave surface portions or channels **138, 140** to receive the out-turned cam ends of the projections **92, 94** of the latch member. The left-hand end of the latch member is thus covered by the flange portions **134, 136** of the keeper when the door is closed and thereby protected or isolated against the direct application of an outside force.

The intermediate or third latch member **40** is a rectangularly shaped, strap or plate-like member, the right-hand end of which overlies and is eccentrically connected to the lock rod **12** by a pivot pin **144** carried by a clevis-like member **146** welded to the lock rod **12.** The opposite end or left-hand end of the member **40** has an inturned or reversed bent portion **148** projecting inwardly and towards the lock rod **12** from the main body portion of the member and providing cam surface **150** diverging from the main body portion towards the lock shaft adapted when the doors are closed to engage cooperating cam surfaces **152** on the underside of spaced projections **156, 158** on forwardly extending portions **160, 162** of the keeper member **42.** The members **156, 158** extend from the portions **160, 162** of the keeper towards one another and at least the undersides thereof, i.e., the sides towards the door D are inclined outwardly away from the free edge **46** of the door.

The strap-like member **40** has on the side thereof adjacent to the doors, a reinforcing rib or flange **164** running lengthwise of the member and on the same side a flange or projection **166** extending toward the left, as viewed in the drawings, from a point near the rod or shaft **12.** The flange **166** extends generally parallel to the main body part of the member **40** and is spaced therefrom a distance to provide clearance between the flange and the main body portion of the member for inwardly extending members **170, 172** of the guide member **44.** The members **170, 172** extend inwardly toward the central reinforcing flange **164** of the member **40** from side portions **174, 176** of the guide member projecting forwardly from spaced base portions **180, 182** which base portions are connected by a center portion **184.**

The constructions of the members **40, 48** are such that as the member **40** is moved upon rotation of the rod or shaft **12** it not only pivots about the pivot pin **150** but it slides and pivots relative to the projections **170, 172** which projections also limit its pivotal movement about the pivot **150.** The length and location of the flange **166** is such that with the body portion of the member **40** provides an aperture or slot within which the projections **170, 172** extend without interfering with rotation of the rod or shaft **12** but within which they are always confined between the flange **166** and the main body portion of the member **40.** As the shaft **12** is oscillated the member **40** will pivot not only about the pin **144** but also about the projections **170, 172.** As the shaft **12** is rotated in a clockwise direction, as viewed in FIG. **6,** the member **40** will swing or pivot about the projections **170, 172** and the free end of the member **40,** that is the end which engages the keeper **42,** will move inwardly toward the plane of the door C, until stopped by the keeper **42** whereupon the guide member **44** will be pulled outwardly. As the door or doors are closed the movement of the member **40** will be in the reverse to that just referred to and the free or latch end of the member **40** will move outwardly with respect to the door C and the inturned part **154** will engage underneath the projections **156, 158** of the keeper **42** to assist in closing the door.

The assembly **48** for holding and locking handle **47** in latch position adjacent the door C includes a back plate **170** and a fixed handle retainer member **172** welded to the lower end of the back plate to form a subassembly that is suitably secured to the door C, and a movable handle retainer member **174** pivotally supported on a bushing and the upper end fixed in an aperture in the back plate **170.** The handle retainer members **172, 174** have their intermediate portions spaced from the back plate so that together they form a recess that receives the handle **47** when the shaft **12** is in latch position. The free ends of the retainer members **172, 174** project at right angles to the back plate **170** and are provided with alignable apertures for receiving a key-controlled lock or seal. The handle **47** can be removed from the retainer assembly **48** by pivoting the movable retainer member **176** about its supporting bushing and lifting the handle from the recess formed by the fixed retainer member **172** and then pulling the handle away from the door. This latter movement rotates the shaft **12** about its longitudinal axis to release the latch members connected thereto from their associated keepers and assist in opening the door.

From the above it will be apparent that a novel and improved door control mechanism has been provided with parts that are inexpensive to fabricate, in which the latch, keeper and bearing members at one end of the mechanism are identical to those at the other end so that a minimum number of different parts are required, and by the use of which a door can be readily latched in a closed, aligned position relative to a door frame and maintained aligned with the door frame.

While a preferred embodiment of this invention has been described in detail, it will be apparent that certain modifications or alterations can be made therein without departing from the spirit and scope of the invention as set forth in the appended claims.

Having thus described my invention, what I claim is:

1. A door control mechanism for securing a swinging door in closed position, said mechanism comprising a shaft, bearing members adjacent to opposite ends of said shaft adapted to rotatably connect said shaft to a swinging door with its axis of rotation spaced from and parallel with the pivotal axis of the door, means for oscillating said shaft about its longitudinal axis, discrete latch members secured to said shaft adjacent to opposite ends thereof each having portions projecting generally in opposite directions transversely of said shaft, discrete keeper members adapted to be secured to structure adjacent to opposite edge portions of the door that extend transversely to the pivotal axis of the door each having a base portion and spaced portions projecting from said base portion for engagement with said projecting portions of said latch members when said bearing members are secured to said door and said keeper members to said structure and said shaft is turned in one direction, one of said portions projecting from said base portion of each of said keeper members having a portion spaced from said base portion providing a surface facing said base portion for engagement by one of

said projecting portions of said latch members when said shaft is turned in said one direction, a third discrete latch member connected to said shaft intermediate its ends for pivotal movement about an axis substantially parallel with but offset from the axis of said shaft, said third latch member having a body portion and a latching portion adjacent to its non-pivoted end providing a surface facing one side of said body portion and said shaft and inclined away from said body portion and a projection on said one side of said body portion intermediate the ends of said third latch member a part spaced from said body portion providing a surface facing said body portion, a discrete guide member adapted to be connected to the door intermediate the edge of the door opposite its pivotal axis and said shaft, said guide member having a portion adapted to be positioned between said body portion of said third latch member and said surface on said part of said projection on said one side of said body portion spaced from said body portion for limiting pivotal movement of said third latch member, and a third discrete keeper member having a base portion adapted to be secured to structure adjacent to the edge of the door opposite its pivotal axis, said third keeper member having a portion spaced from said base portion providing a surface facing said base portion and inclined with respect thereto for engagement by said surface on said latching portion of said third latch member when said shaft is turned in said one direction.

2. A door control mechanism for securing a swinging door in closed position, said mechanism comprising a shaft, bearing members adjacent to opposite ends of said shaft adapted to rotatably connect said shaft to a swinging door with its axis of rotation spaced from an parallel with the pivotal axis of the door, means for oscillating said shaft about its longitudinal axis, discrete latch members secured to said shaft adjacent to opposite ends thereof each having portions projecting generally in opposite directions transversely of said shaft, discrete keeper members adapted to be secured to structure adjacent to opposite edge portions of the door that extend transversely to the pivotal axis of the door each having a base portion and spaced portions projecting from said base portion for engagement with said projecting portions of said latch members when said bearing members are secured to said door and said keeper members to said structure and said shaft is turned in one direction, one of said portions projecting from said base portions of each of said keeper members having a portion spaced from said base portion providing a surface facing said base portion for engagement by one of said projecting portions of said latch members when said shaft is turned in said one direction, a third discrete latch member connected to said shaft intermediate its ends for pivotal movement about an axis substantially parallel with but offset from the axis of said shaft, said third latch member having a body portion and a latching portion adjacent to its non-pivoted end providing a surface facing one side of said body portion and said shaft and inclined away from said body portion and a projection on said one side of said body portion intermediate the ends of said third latch member having a part spaced from said body portion providing a surface facing said body portion, a discrete guide member adapted to be connected to the door intermediate the edge of the door opposite its pivotal axis and said shaft, said guide member having a portion adapted to be positioned between said body portion of said third latch member and said surface on said part of said projection on said one side of said body portion spaced from said body portion for limiting pivotal movement of said third latch member, and a third discrete keeper member having a base portion adapted to be secured to structure adjacent to the edge of the door opposite its pivotal axis, said third keeper member having a portion spaced from said base portion providing a surface facing said base portion and inclined with respect thereto for engagement by said surface on said latching portion of said third latch member when said shaft is turned in said one direction, said third latch member providing a surface facing in the same direction as said one side of said body portion of said third latch member faces for abutment with said third keeper member upon rotation of said shaft in the direction opposite said one direction.

* * * * *