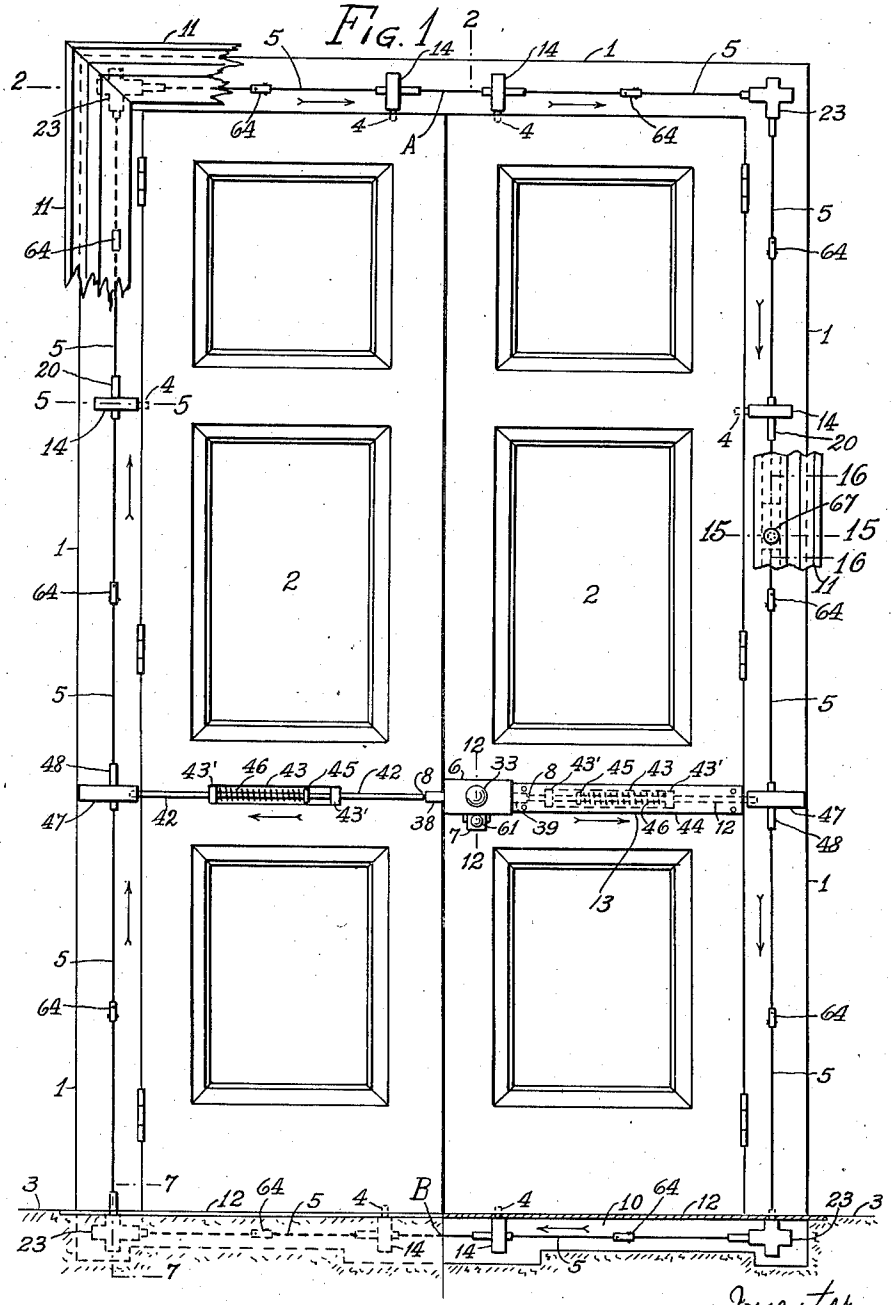
Jan. 5, 1937. A. P. VAZQUEZ 2,066,705

LOCKING SYSTEM FOR DOORS AND WINDOWS

Filed Dec. 14, 1935 3 Sheets-Sheet 1

FIG. 1



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LOCKING SYSTEM FOR DOORS AND WINDOWS

Filed Dec. 14, 1935 3 Sheets-Sheet 2

FIG. 2

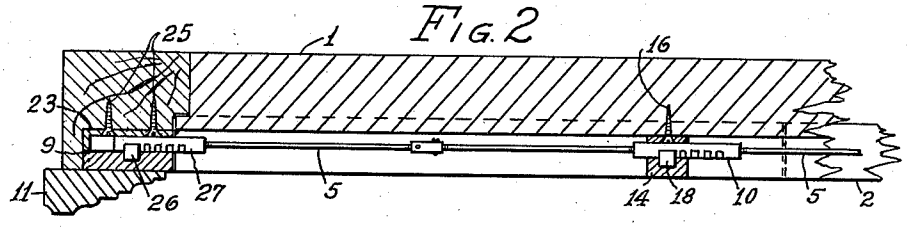


FIG. 3

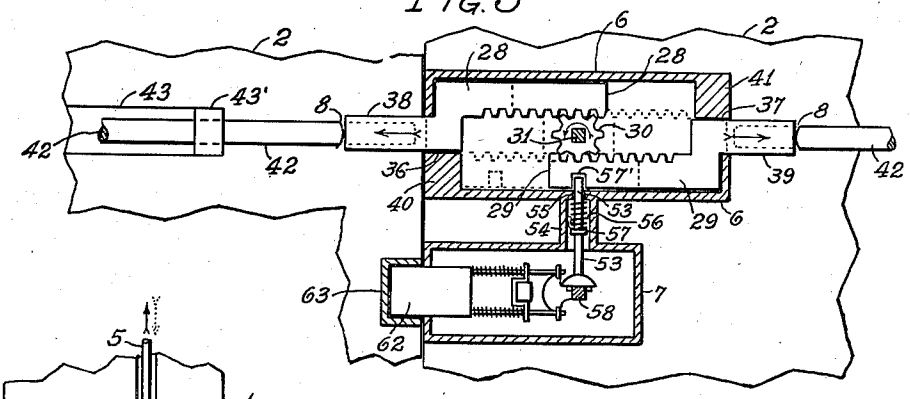


FIG. 4

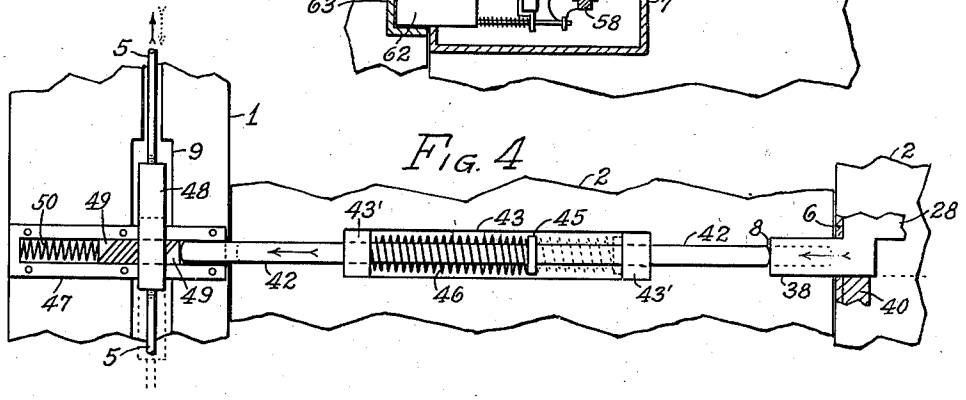


FIG. 5

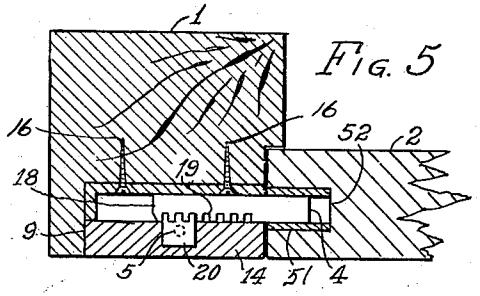
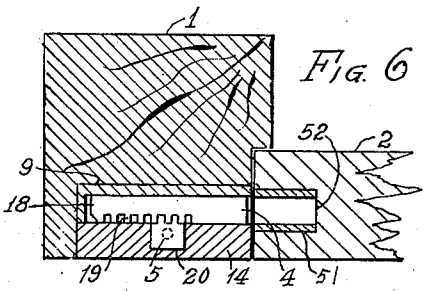


FIG. 6



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LOCKING SYSTEM FOR DOORS AND WINDOWS

Filed Dec. 14, 1935 3 Sheets-Sheet 3

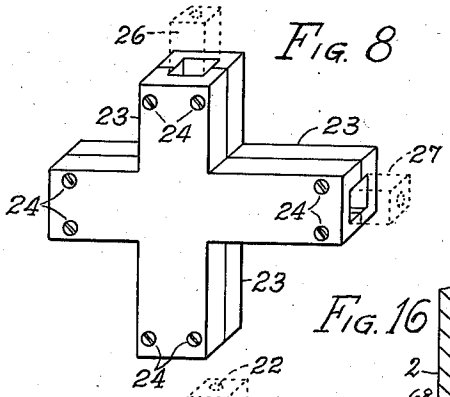


Fig. 8

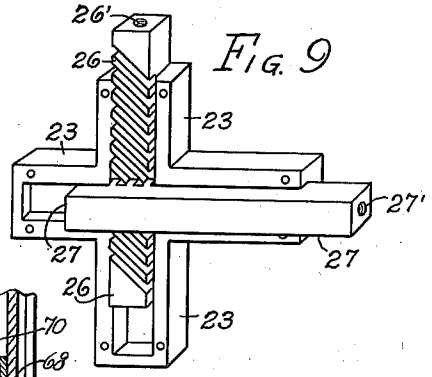


Fig. 9

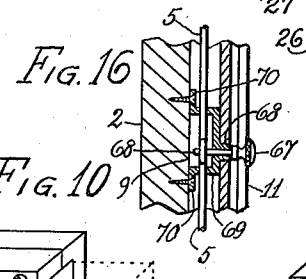


Fig. 16

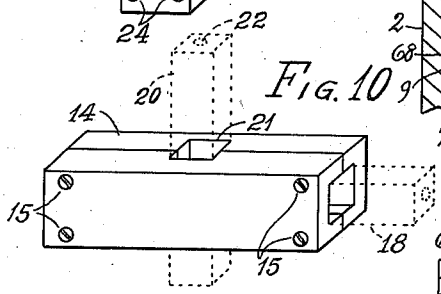


Fig. 10

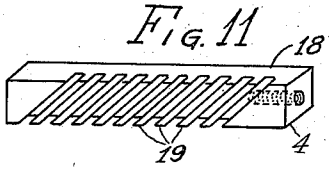


Fig. 11

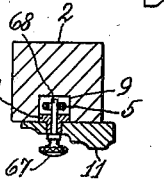


Fig. 15

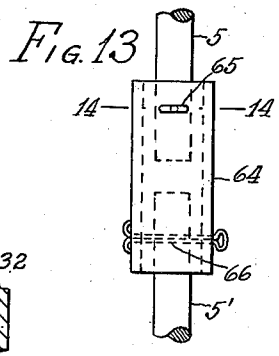


Fig. 13

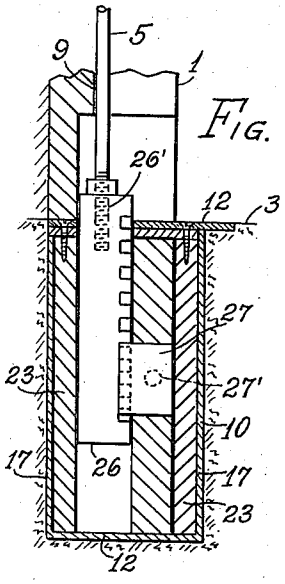


Fig. 7

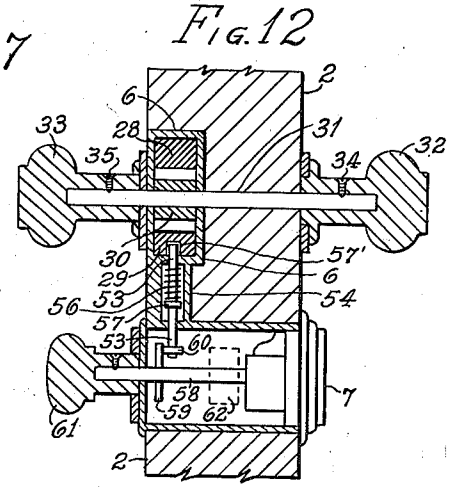


Fig. 12

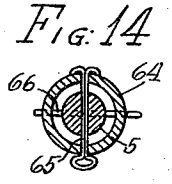


Fig. 14

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UNITED STATES PATENT OFFICE

2,066,705

LOCKING SYSTEM FOR DOORS AND WINDOWS

Antonio Posse Vazquez, Habana, Cuba

Application December 14, 1935, Serial No. 54,505
In Cuba September 11, 1935

4 Claims. (Cl. 70—74)

This invention relates to locking systems for doors and windows, and it has for its object to provide a locking system for doors and windows which differs from all the locking systems at present known and by means of which each leaf of a door or window of the casement type is secured at several points of its contour as well as about its middle portion by means of a plurality of locking devices mounted at several places in the jambs, lintel and threshold of the door or window-frame, and which actuate from the frame of the door or window-leaves to secure the latter, the locking devices being connected to each other to be acted on at the same time by a controlling device located at the centre of the door or at the place ordinarily occupied by the usual lock with which the system is associated, the whole system being concealed within the frame and the door-leaves with the exception of the control casing and the lock located at the centre of the door. Further the invention comprises a simple and efficient system which, without need of combination devices, secures the door or window at various concealed points which cannot readily be forced simultaneously.

Another object of the invention is the provision of a means for securing one door or window-leaf independently of the other leaf and securing both leaves, from the same controlling device located at the centre of the door, at several points along that portion of the contour of each leaf which is adjacent the door or window-frame.

A further object of the invention is to provide a concealed safe means for securing in locking position the locking means referred to, against violation of the lock or controlling device from the outside.

The invention is described with reference to the figures of the accompanying drawings, of which:

Fig. 1 is a front elevational view of a door and its frame from the outside, embodying the locking system constituting the subject-matter of this invention, the moulding that covers the frame being shown broken away.

Fig. 2 is a horizontal sectional view of the frame on line 2—2 of Fig. 1.

Fig. 3 is a longitudinal vertical sectional view of the control casing and the lock associated therewith, both being mounted on the middle portion of the door.

Fig. 4 is a longitudinal vertical sectional view of the impact connection extending from the control casing at each side thereof and transversely of the door to transmit simultaneously a drawing action to the various bolt locking devices located at several points of the door contour.

Fig. 5 is a horizontal sectional view of a locking device mounted on the frame and an annexed door-leaf on line 5—5 of Fig. 1, showing the device in closed position.

Fig. 6 is a sectional view similar to that of Fig. 5, showing the locking device in open position.

Fig. 7 is a vertical sectional view of a device for transmitting a sliding motion in perpendicular directions mounted at a corner of the threshold of the door, on line 7—7 of Fig. 1.

Fig. 8 is a detailed perspective view showing the cross-shaped casing of one of the devices for transmitting sliding motion in perpendicular directions.

Fig. 9 is a detailed view showing one half the casing of one of the devices for transmitting sliding motion, to show the two inner meshing rack members each provided with oblique teeth at 45°, which form the mechanism for transmitting sliding motion in perpendicular directions.

Fig. 10 is a detailed perspective view showing the casing of one of the locking devices for intermediate points between the corners of the door.

Fig. 11 is a detailed perspective view showing one of the rack members provided with oblique teeth at 45°, which form the mechanism of the locking device and of the devices for transmitting sliding motion in perpendicular directions.

Fig. 12 is a vertical cross-section view of the control casing of the system and annexed lock, on line 12—12 of Fig. 1.

Fig. 13 is an outer elevational detailed view of a preferred form of coupling between two portions of a connection rod connecting two adjacent locking devices, to compensate the deviations caused by unleveling of the system.

Fig. 14 is a horizontal section on line 14—14 of Fig. 13.

Fig. 15 is a detailed horizontal section view on line 15—15 of Fig. 1, showing a safe means for protecting the locking means of the system against violation from the outside.

And Fig. 16 is a vertical section on line 16—16 of Fig. 1.

This locking system consists of a plurality of bolt locking devices provided at several points along the jambs and lintel of the frame 1 of a door or window 2 which may be either of one or two leaves (in Fig. 1 is shown a two-leaf door 2 as an example) and at various points of the threshold of the floor 3 which serves as bases for the door-opening. The locking devices 4

have bolts adapted to be inserted simultaneously within recesses suitably formed in the edges of each door-leaf 2 and being fastened together by connecting rods 5 which form a loop around the door 2 and are acted on from a control casing 6 placed at the centre of the door near the lock 7 with which it is associated and by means of which it can be operated by hand, through impact connections 8 extended from the control casing in both directions and transversely of the leaves of the door 2.

The bolt locking devices 4 and the connecting rods 5 are lodged in recesses 9 formed in the jambs and lintel of the frame 1 and in holes 10 formed in the threshold of the cement floor 3, the recesses 9 of the frame 1 being covered with a wooden moulding 11 and the holes 10 of the floor being covered with a metallic plate 12 which serves as a cover for the floor. Likewise, the impact connections 8 extending transversally at both sides of the control casing 6 are lodged in transverse recesses of the leaves of the door 2 and covered with metallic plates 13.

The bolt locking devices 4 which are placed at various points along the jambs and lintel of the frame 1 and the threshold of the floor 3, consist of simple metallic casings of rectangular transversal section 14 (Fig. 10) which are divided in two longitudinal halves joined by screws 15 and are placed perpendicularly to the edge of each door-leaf 2 and fixed to the frame 1 by screws 16 or lodged within the hollow 10 of the threshold of floor 3 wherein they are protected by a cover of metallic plate 17. Within the longitudinal hollow of the casing 14 is slidably mounted a rack member 18 provided with oblique teeth 19 at 45°, and which has an end constituting a bolt 4. The rack member 18 meshes with another rack member 20 slidably mounted through a slot 21 formed across both halves of the casing 14 and has at its ends threaded drill holes 22—the threads of one end being in a contrary direction to the threads of the other end—to receive the threaded ends of the connecting rods 5 forming the connections of the locking system.

Devices for transmitting a sliding motion in perpendicular directions are arranged at the corners of the frame 1, which consist of cross-shaped metallic casings 23 (Figs. 8 and 9) of rectangular transverse section and which are divided in two juxtaposed longitudinal halves fixed to each other by means of screws 24, said casings 23 being fixed within recesses 9 of the frame 1 by means of screws 25. Within the cross-shaped inner longitudinal spaces of each casing 23 are slidably mounted two meshing perpendicular rack members 26 and 27 provided with oblique teeth at 45°, and with threaded drill holes 26' and 27' respectively to threadedly receive the threaded ends of the connection rods 5 forming the connections of the locking system. These two rack members 26 and 27 constitute a mechanism for transmitting in perpendicular directions the draw action exerted upon the connection rods 5 from the control casing 6 through the means described hereinafter. For facilitating the construction and assemblage of the casings 23 their halves are preferably formed in the shape of a cross-piece of four equal arms.

The control casing 6 consists of a closed metallic box of rectangular transverse section which is inserted and fixed within a recess in one of the door-leaves 2 at the middle portion thereof or at the place occupied by the ordinary lock 7. Its inner mechanism consists of two rack members 28 and 29 of right teeth, which are disposed parallelly to each other and respectively close to the upper portion and the bottom of the casing 6. Both rack members mesh with a gear pinion 30 whose horizontal shaft 31 passes through the fore and rear walls of the casing 6 and its projecting ends have knobs 32 and 33 which are fixed by set screws 34 and 35 to the shaft 31. The rack members 28 and 29 are a little longer than half the length of the casing and their ends are bent twice at right angle to project outside of the casing 6 through openings 36 and 37 formed in the edge walls of the casing 6 and extend to the outside in the form of push bolts 38 and 39, the edge walls of the casing being thickened to form respective butt sections for the opposed ends of the rack members 28 and 29 (Fig. 3).

Along the whole width of each door-leaf 2 is, located in alignment with each rack bolt 38 and 39, an impact rod 42 slidably mounted on a supporting piece 43 provided with end guides 43', fixed in a recess of the door-leaf 2 and covered with a metallic plate 44 (as shown in the leaf at the right side of the door, Fig. 1). Said rod 42 has a collar 45 and between the latter and the guide 43' adjacent to the joint of the door-leaf 2 with the frame 1 is mounted about the rod 42 a coil spring 46 whose purpose is to normally push the rod 42 against the adjacent rack bolt 38 or 39. On the jamb of the frame 1 and in transverse alignment with the impact rod 42 is fixed a device 47 for transmitting a sliding motion in perpendicular directions, which is similar to the bolt locking devices 4 (Fig. 10) with the difference that it has (Fig. 4) a vertically disposed long rack member 48 provided with oblique teeth at 45° and a horizontally disposed short rack member 49 provided with oblique teeth at 45° and whose end face adjacent to the joint of the frame and door-leaf is adapted to engage the end face of the impact rod 42 and to be pushed by the latter. Between the opposed end face of the short rack member 49 and the closed end wall of the casing 47 is interposed a coil spring 50 adapted to force the short member 49 to advance as the impact rod 42 is drawn back by the opening action of the control casing 6. In the advance sliding movement of the rod 42, the short horizontal rack member 49 will be pushed toward the opposed end of the casing of the device, and as it meshes with the vertical rack member 48 which is connected at its ends with the connection rods 5 of the system, it will thereby transmit the sliding motion in upward and downward directions to the bolt locking devices 4 located above and beneath on the same jamb of the frame 1. In this manner it will be understood that by the inverted action of the coil springs 46 and 50 mounted on opposed sides of the control casing 6, when the knobs 32 and 33 are operated to actuate the locking system, all the connection rods 5 of the system will be drawn in the same direction in the whole loop of the system, as shown by arrows in Fig. 1. The coil springs 46 and 50 will, of course, be made of the necessary strength to overcome the friction developed by the meshing elements in the system. Of course this friction can be reduced to a minimum by a proper machining and designing of the parts and by keeping the parts properly lubricated through any suitable lubricating system.

The bolts 4 of the locking devices lock by introducing themselves in sockets 51 lodged in hollows 52 formed in the outer edges of the door-leaves 2.

In the open position of the locking system, the rack bolts 38 and 39 remain concealed within the control casing 6 in the positions indicated by dotted lines in Fig. 3, and in the closed position of the locking system said rack bolts 38 and 39 are projected outside of the ends of the control casing 6 in the positions indicated with full lines in Fig. 3, both positions being obtained by causing the pinion 30 to be rotated by means of one of the knobs 32 and 33, from left to right or from right to left respectively. In the closed position, the system is automatically locked by means of a pin or vertical bolt 53 slidably mounted beneath the control casing 6 in a small box 54 for connection with the lock casing 7 fixed on the same door-leaf 2 carrying the control casing 6, and the vertical bolt 53 passes through an opening 55 formed in the bottom of the casing 6 by virtue of the elastic tension of a coil spring 56 rolled thereon between a collar 57 fixed to the bolt 53 and the bottom of the casing 6, and which is adapted to enter into a hollow 57' formed at the inner face of the lower rack member 29 when it stands opposed to the opening 55. Said bolt 53 disengages the rack member 29 from the outside of the door 2 by the action of a key being introduced in the lock 7 and causing the shaft of the lock to rotate, to which end this shaft has fixed thereon a cam disc 59 adapted to actuate on an inner projection 60 of the bolt 53 and carries a knob 61 at the inner side of the door.

When it be desired to use the door 2 independently of the system, the member 62 of the lock 7 will operate as usual by sliding inwardly to and outwardly from the keeper 63 fixed to the door-leaf 2 opposed to that carrying the lock 7, and the handles 32 and 33 are simply to serve as such, (previously leaving the system in open position or in the position in which the bolt 53 does not engage the hollow 57' of the lower rack member 29 of the control casing 6.)

In order to compensate the deviations which may take place in the connection rods 5 by an unleveling of the system such as may cause a lack of vertical or horizontal alignment of the locking devices 4, each connection rod is divided into two portions 5 and 5' which are fastened to each other by means of a tubular coupling 64 whose inner diameter is considerably greater than the thickness of the rods 5 and 5' whose ends introduced in the tube 64 have holes through which pass crosswise pins 65 and 66 mounted through holes formed in the peripheral wall of the tube 64, thus permitting a change in the side position of the rods 5 and 5' with respect to the coupling tube 64.

For that purpose a safe device for one of the connection rods 5 of each side (Fig. 1) may be arranged at any point of each side of the system or of each jamb of the frame 1, at the inside of the door, which safe device will consist simply of a knob 67 carried at the outer end of a bolt 68 slidably mounted on a guide-piece 69 provided with outer lugs 70 for fixing it by means of screws through holes in said lugs within the recess 9 of the frame in which the rods 5 and 5' are lodged, one of said rods 5 passing through a vertical hole in said guide-piece 69, and the bolt 68 being adapted for the insertion of its inner point into a hole formed in the rod 5, upon the knob 67 being pushed inwardly by the hand.

It should be understood that changes in the details of construction and shape of the parts may be made without departing from the spirit of the invention or the scope of the appended claims.

What I claim is:

1. A locking system for doors, comprising a plurality of bolt locking devices located at the lintel and jambs of the door-frame and at the threshold of the door in cooperation with recesses formed in the outer edges of these leaves, devices for transmitting a draw action in perpendicular directions, which are mounted on the corners of the door-frame, means for connecting the locking devices and the draw action transmitting devices to form a loop around the door, a lock, a hand-controlled mechanism mounted adjacent the lock, means operable upon locking said lock for placing the control mechanism in operative position, devices for transmitting a draw action in perpendicular directions, which are fixed to the jambs of the frame in transverse alignment with the control mechanism, means under elastic tension for transmitting the push action from the control mechanism to the side devices transversely aligned with it, which operate in opposed directions to produce movement of the loop formed by the connecting means between the locking devices at each side of the separating line between both door-leaves, and resilient means acting on the side draw action transmitting devices for forcing the latter to take a suitable position for receiving the push action from the control mechanism.

2. A locking system for doors, comprising a plurality of bolt locking devices located at the lintel and jambs of the door-frame and at the threshold of the door, each comprising two perpendicular rack members each provided with oblique teeth at an angle of 45° and meshing with each other and of which the one which is perpendicular to the longitudinal direction of the frame ends in a bolt, recesses formed in the adjacent edges of the door for receiving the bolts of the locking devices, devices for transmitting a draw action in perpendicular directions which are mounted on the corners of the frame and comprise two perpendicular rack members each provided with oblique teeth at an angle of 45° and meshing with each other, means for connecting the locking devices with the sliding motion transmitting devices located at the corners, to form a loop around the door, a lock, a control mechanism mounted adjacent the lock, draw action transmitting devices fixed to the jambs of the frame in transverse alignment with the control mechanism and which comprises two perpendicular rack members each provided with oblique teeth at an angle of 45° and meshing one with each other, and means for transmitting the push action from the control mechanism to the side devices transversely aligned with it.

3. A locking system for doors, comprising a plurality of bolt locking devices located at the lintel and jambs of the door-frame and at the threshold of the door and each comprising two perpendicular rack members each provided with oblique teeth at an angle of 45° and meshing with each other and of which the one which is perpendicular to the longitudinal direction of the frame ends in a bolt, recesses formed in the adjacent edges of the door to receive the bolts of said locking devices, devices for transmitting a draw action in perpendicular directions which are mounted on the corners of the frame and each consisting in two perpendicular rack members each provided with oblique teeth at an angle of 45° and meshing with each other, con-

necting rods between the rack members of the locking devices and the rack members of the draw action transmitting devices which are parallel to the frame and form a loop around the door along which loop the draw action is transmitted in pre-determined directions for operating the bolts of the locking devices simultaneously, a lock, a control mechanism mounted adjacent and above the lock, draw action transmitting devices fixed to the jambs of the frame in transverse alignment with the control mechanism and each consisting of two perpendicular rack members each provided with oblique teeth at an angle of 45° and meshing with each other, bars under the elastic tension of coil springs for transmitting the push action from the control mechanism to the side devices transversely aligned with it, which operate in opposed directions to produce movement of said loop formed by the connecting rods, and coil springs acting on each of the horizontal rack members of the side draw action transmitting devices for forcing them to take a suitable position for receiving the push action from the control mechanism.

4. A locking system for doors, comprising a plurality of bolt locking devices located at the lintel and jambs of the door-frame and at the threshold of the door and adapted to engage recesses formed in the door, devices for transmitting a draw action in perpendicular directions, mounted on the corners of the door-frame, rods for connecting the locking devices with the draw action transmitting devices to form a loop around the door, a lock, connecting rods between adjacent locking devices, a hand-controlling mechanism mounted adjacent and above the lock and comprising a pinion whose shaft is provided with handles and which meshes with two horizontal rack members ending in push bolts, a bolt under elastic tension adapted to engage one of the rack bars and to lock the control mechanism, means operable upon locking said lock for disengaging the bolt from the rack member, draw motion transmitting devices fixed to the jambs of the frame in transverse alignment with the push bolts of the control mechanism, impact bars under the elastic tension of coil springs which are adapted to be pushed by the push bolts of the control mechanism in opposed directions and in turn to push one of the movable members of the side draw action transmitting devices and to transmit the draw action in perpendicular directions, coil springs acting on one of the movable members of the side draw action transmitting devices for forcing them to take a suitable position for receiving the push action from the control mechanism, and a bolt slidably mounted on a point of the door-frame and operable from the inside of the door for securing in safe position the locking devices for each door-leaf.

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