

[54] **MULTIPLE BOLT AND KEEPER LOCK** 1,500,540 7/1924 Beranger..... 292/33  
 3,663,047 5/1972 Zawadyki..... 292/21

[75] Inventor: **Francois Guiraud**, Chambourcy, France

[73] Assignee: **Fichet-Bauche**, Velizy, France

Primary Examiner—Richard E. Moore

[22] Filed: **Feb. 1, 1974**

[21] Appl. No.: **438,752**

[30] **Foreign Application Priority Data**  
 Feb. 5, 1973 France ..... 73.3984  
 Nov. 13, 1973 France ..... 73.40327

[52] **U.S. Cl.** ..... 292/33  
 [51] **Int. Cl.<sup>2</sup>** ..... E05C 9/04  
 [58] **Field of Search** ..... 292/21, 33, 259, 337

[57] **ABSTRACT**

A locking device is provided which comprises several bolts adapted to be actuated simultaneously from a common safety mechanism comprising transmission means between the mechanism and the bolts. The bolts and mechanism assembly is received in a first case adapted to be applied onto a door leaf, whereas the keepers cooperating with said bolts are provided in a second case to be applied onto a door frame.

[56] **References Cited**  
**UNITED STATES PATENTS**  
 1,117,457 11/1914 Smith..... 292/21

10 Claims, 7 Drawing Figures

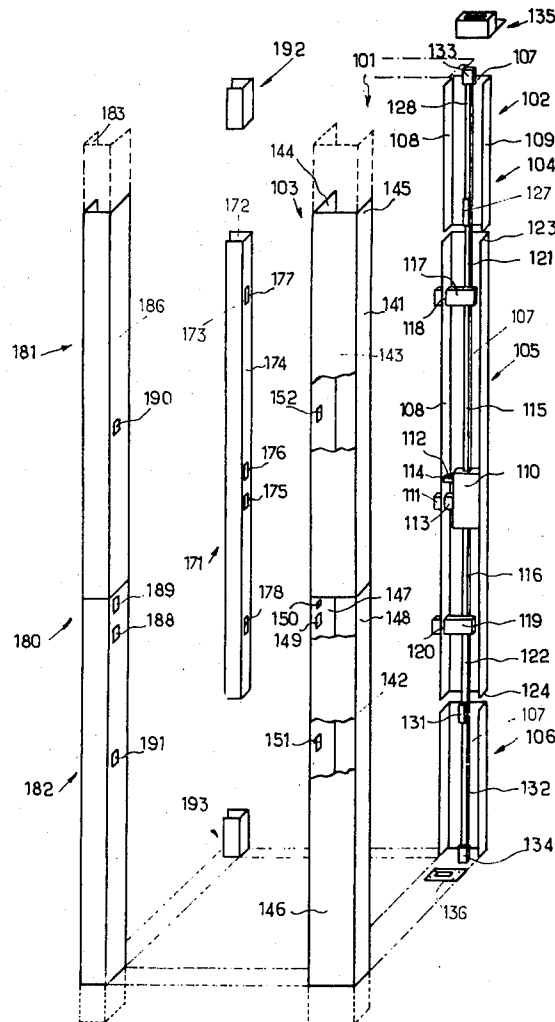


FIG. 1

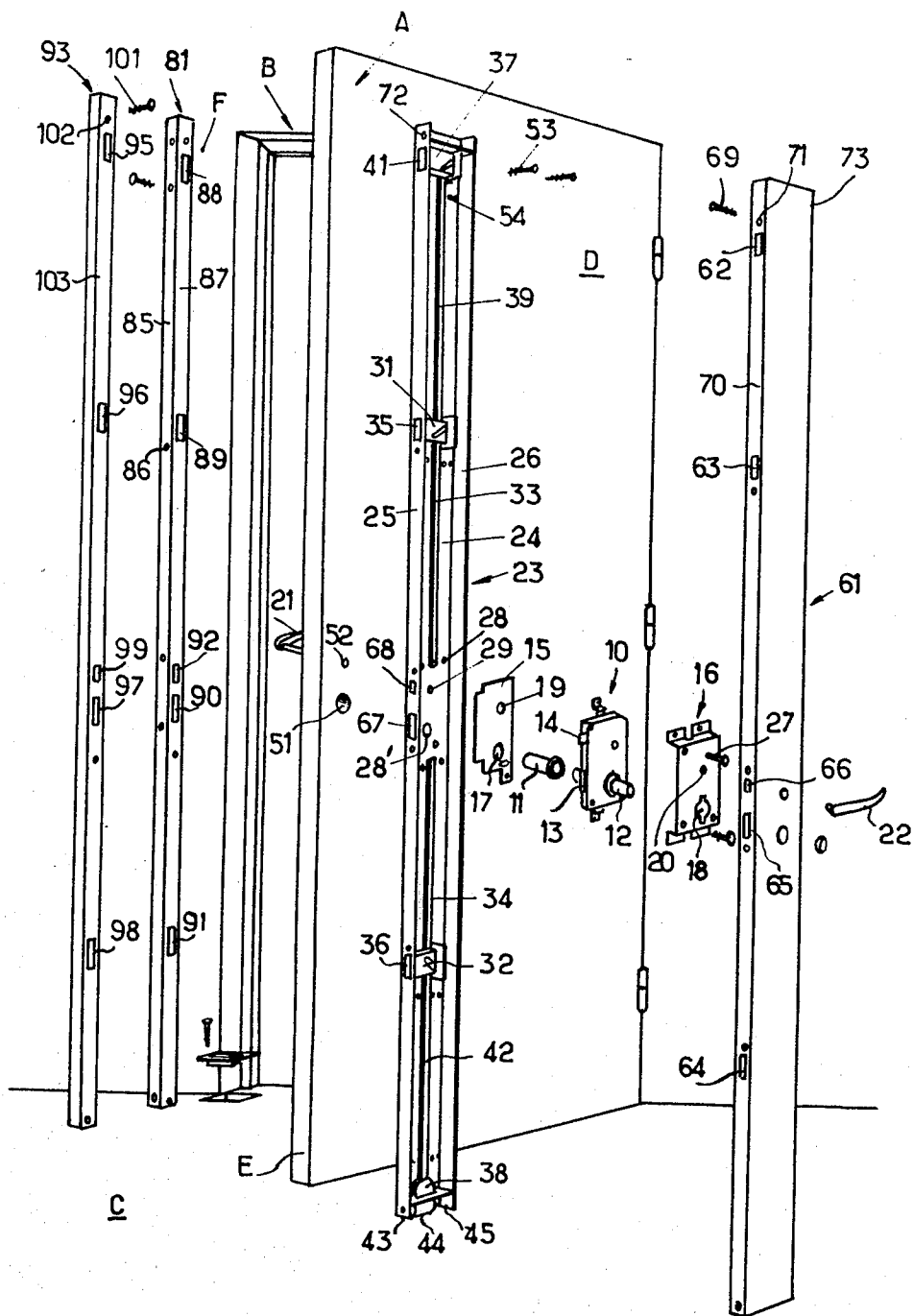


FIG. 2

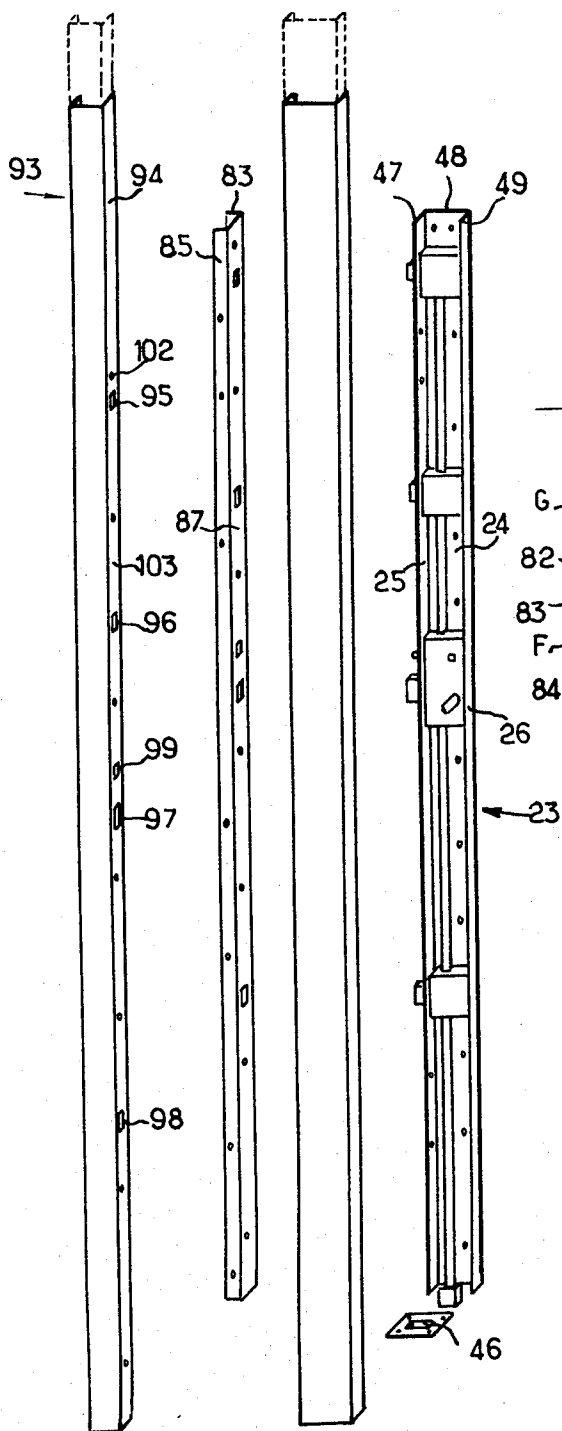
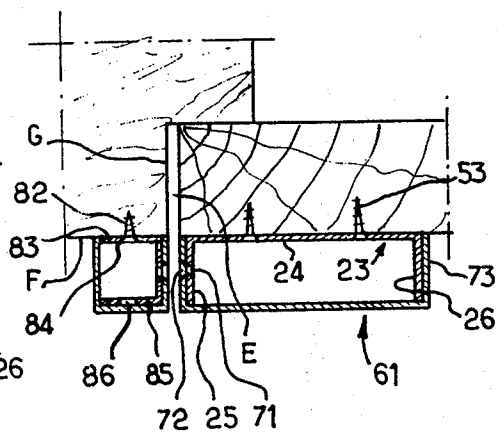


FIG. 3



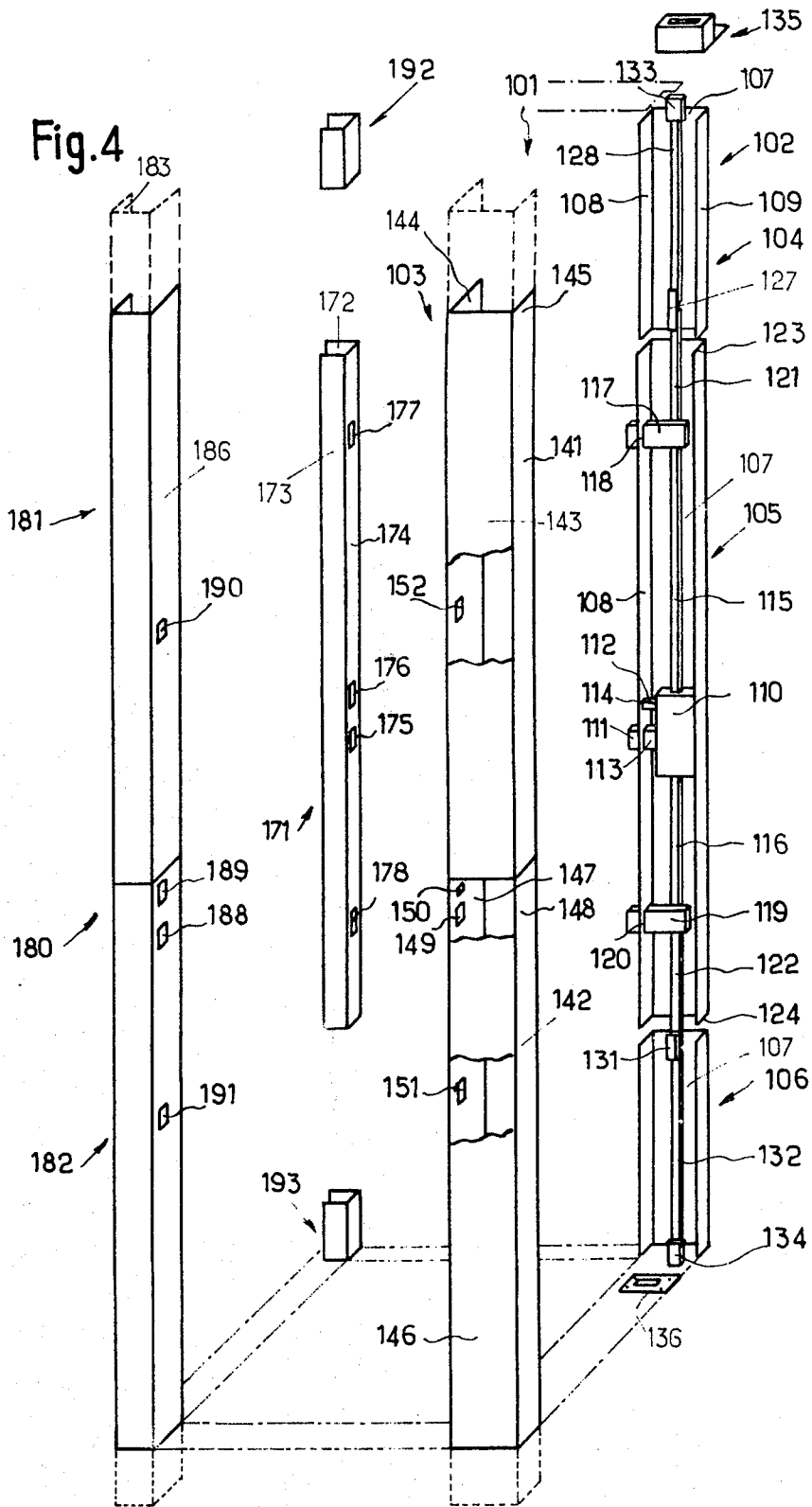


Fig. 5

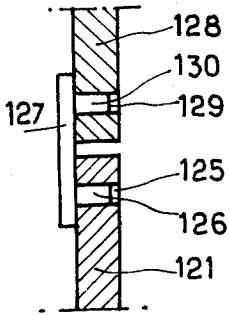


Fig. 6

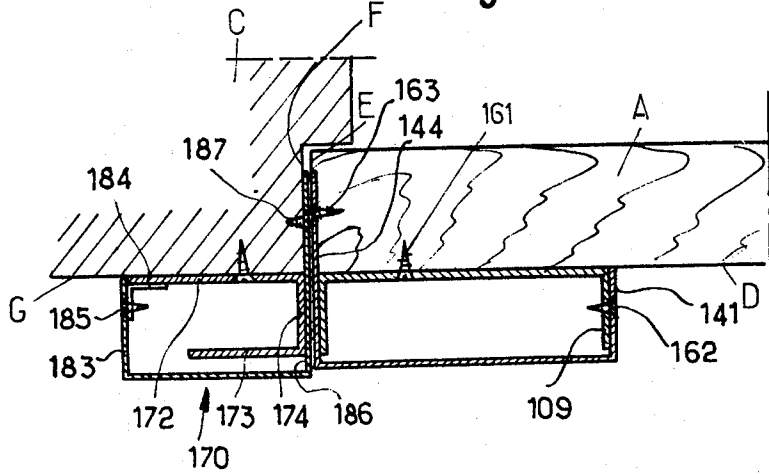
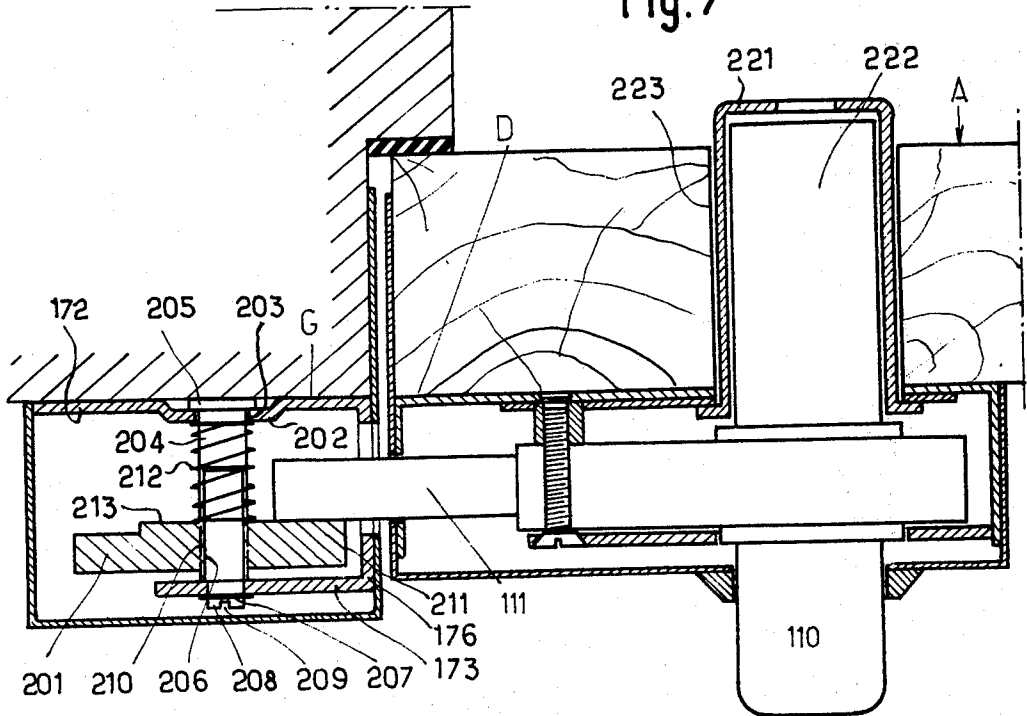


Fig. 7



## MULTIPLE BOLT AND KEEPER LOCK

The invention relates to a device for preventing door breaking by burglars.

The closing condition of a door is usually met by providing a lock comprising a bolt carried by the door leaf and cooperating with a keeper mounted in the frame, the bolt movement being controlled by a key-actuatable mechanism.

Although the mechanism structure is intended for preventing actuation of the lock by a person other than the owner of the key, the door is not secure from the danger of been broken open resulting from actions by means of tools particularly for destroying the interdependence of the door leaf and frame.

It has been proposed for strengthening the lock to provide the leaf with several bolts having corresponding keepers in the frame, actuation of the bolts being obtained by a single safety key mechanism.

Multiple bolt and keeper locks are relatively difficult to mount as they require a skilful workman capable of performing wood and iron work, in view of the various bolts and keepers which are to be accurately secured to their respective positions.

Moreover, deformations occurring after fixation of the lock due to temperature and moisture variations affecting the wooden parts cause functional disturbances which can only be avoided through adjusting means thereby complicating fabrication and fixation of the lock.

The locking device according to this invention eliminates these disadvantages and suppresses these difficulties. It is characterized in that the lock proper, with a plurality of bolts and keepers, is housed in two cases, one of which contains the safety mechanism, the bolt and the means for transmitting movement from the safety mechanism to the bolts, whereas the other case contains keepers cooperating with the bolts.

The cases being provided with the safety mechanism, the bolts and the transmission means on the one hand, and the keepers on the other hand, it is sufficient to secure one of them to the leaf and the other to the frame to obtain in one mounting operation a lock having cooperating bolts and keepers disposed in the conjugate locations determined by the manufacturer.

The leaf edge usually made of wood or the like and the opposite edge of the frame usually of wood or the like, are both fitted with a metallic stiffener so that it becomes much more difficult or even impossible to distort them by means of tools. Moreover, the locking device is insensitive to temperature and moisture variations.

The invention relates to a device in which the strengthening parts for the leaf and the frame respectively are both constituted by metallic profiled sections.

In an embodiment of the invention the cases are each in two such sections, the assembling of which is obtained by means of screws or the like, so located as to be inaccessible in the door closed position.

In another embodiment the invention is characterized in that a case to be secured to the frame consists of several parts to be put end to end longitudinally so that doors of different heights can be equipped with a lock according to the invention.

This embodiment is also characterized in that the case body comprises a first central portion receiving the lock and the horizontally movable bolts, and upper

and lower end portions receiving the vertically movable upper and lower bolts.

The cover for such a body case is advantageously made in two parts to be brought together on a level with the lock proper.

Reinforcement of the frame and the leaf by metallic sections is obtained in the same way.

The following exemplifying description refers to the attached drawing in which:

FIG. 1 is a perspective view of a device according to the invention which is being mounted on a door, some parts being spaced from one another for clarity;

FIG. 2 is a perspective view of a device according to the invention, the main parts being spaced from one another;

FIG. 3 is a horizontal cross-section of a device after mounting, some constitutive parts being omitted;

FIG. 4 is a perspective view of another embodiment;

FIG. 5 is a cross-sectional larger scale view showing the connection between two bars;

FIG. 6 is a horizontal cross-sectional view;

FIG. 7 is a horizontal cross-sectional view in a larger scale of an embodiment taken at the height of the lock.

The lock device according to the invention is intended to be mounted on a door comprising a leaf A and a frame B. It comprises a safety or operating mechanism 10 which can be of a type having safety cylinders 11 and 12, a first bolt 13 and a half-turn 14; it is completed by plates or covers 15 and 16 formed with holes 17 and 18 for a key and holes 19 and 20 for actuating the half-turn by means of handles or hooks 21 and 22.

The safety mechanism 10 is put in the central portion of a profiled section 23 of a U-shaped cross-section which practically covers the height of the door leaf A. Section 23 has a bottom portion 24 and wings 25 and 26. Fixation of the mechanism is made by screws 27 cooperating with holes 28 in bottom portion 24. The latter has a hole 28' for the key and a hole 29 for the half-turn square.

Section 23 also receives bolts 31 and 32 distributed longitudinally of the section substantially half-way between the mechanism and the section ends and actuable from mechanism 10 through rods or transmission bars 33 and 34 resp., the bolts traversing inner wing 25 of section 23 through apertures 35 and 36 resp.

The section 23 receives bolts 37 and 38 near its ends. Bolt 37 can be brought into a projecting position by actuation of mechanism 10 through a transmission 39 after passing through an aperture 41 in the section wing 25. Bolt 38 can be brought into a projecting position relative to the lower edge of section 23 delimited by sides 43, 44, 45 of wing 25, forward portion 24 and wing 26, by acting upon mechanism 10, the movement being transmitted by a rod or tringle 42; a keeper 46 is mounted in floor C.

Section 23 possibly being reduced to a suitable length at its upper portion to match the height of the door, in the portion having edges shown at 47, 48, 49, is secured to the inner face D of leaf A by means of screws as shown at 53 traversing bottom portion 24 through holes 54, after drilling two holes 51 and 52 for allowing the passage of a cylinder and the square key for the half-turn.

The screws are distributed along the section for securing proper mounting in the predetermined position marked beforehand in the width and length of the door leaf A, the wing 25 extending along edge E of leaf A.

Section 23 is then closed by a cover 61 also consisting of a U-shaped section. The cover 61 is formed with apertures 62, 63, 64 for passage of bolts 37, 31 and 32, and an aperture 65 for passage of the central bolt included in mechanism 10 and an aperture 66 for passage of the half-turn. The aperture 65 is made opposite an aperture 67 formed in wing 25 and aperture 66 is made opposite an aperture 68 formed in wing 25.

The cover 61 is secured by means of screws, as at 69, traversing the wing 70 of the cover through holes 71 and wing 25 of the case through holes 72. Securing screws also pass through the other wings 73 and 26 resp. Sections 23 and 61 once assembled form a case. Wing 70 of the section 61 is aligned with the edge portion E of door leaf A.

Mounting of the assembly on the leaf A is effected easily in one move comprising fixation of section 23 and positioning of cover 61.

The frame B is provided on its inner face F with a metallic section 81 which is U-shaped in cross-section and is of the same length as section 23; it is secured by screws 82 traversing holes 84 formed in wing 83 of the section and corresponding to opposite holes 86 in the other wing 85, of a suitable dimension to permit passage of the screw heads and a screwdriver used during the fixation.

The bottom portion 87 of the section has apertures 88, 89, 90, 91 which form keeper members for the bolts distributed along the height of the locking device. The assembling in the predetermined position of section 81 readily permits accurate positioning of the keeper relative to the respective bolts. The aperture 92 provided in the bottom portion 87 serves for passage of the half-turn.

A second section 93 is applied over the section 81 so as to form with it a hollow prismatic body or case: the wing 94 of section 93 has apertures 95, 96, 97, 98 corresponding to apertures 88, 89, 90 and 91 and forming therewith keepers for the regularly distributed bolts. The aperture 99 in wing 94 for passage of the half-turn corresponds to aperture 92.

Section 93 is united to section 81 by means of screws as at 101 traversing holes 102 in wing 103 of section 93 joined to the bottom portion 87 of section 81. Wing 94 of section 93 is aligned with edge portion G of the frame.

Advantageously, the sections 23 and 81 are manufactured with a length slightly smaller than the minimum height of the standard doors.

They can be used both for equipping doors of a minimum height and doors of a larger height.

However sections 61 and 93 are advantageously made of a larger length, for instance 2.50 m and can be mounted on most doors. They are cut during the assembling so as to match the height of the door to be equipped. They can be treated to be compatible with the door body, for example, according to a wood veneer pattern thereby simply meeting aesthetic requirements of architects, without it being necessary to lodge the device within the door, which would entail significant mounting complications, would make the door weaker and would cause defective operation of the mechanism.

Section 23 with its cover 61 strengthens the edge of the leaf and the two sections 81 and 93 strengthen the edge of the frame.

The anchoring points being provided by one-piece cases, exceptional rigidity of the assembly is obtained and the safety from the danger of door breaking by burglars is superior to what can be reached by the known devices.

The bolts are actuated simultaneously by a single operation of the master mechanism 10 and good cooperation with the keepers is ensured notwithstanding temperature and moisture variations.

The assembling screws are inaccessible from the outside when the door is in the closing condition.

The sections constituting the cases may be of a different shape than the one described, for instance, a trapezoidal shape. The covers may have an edge to be applied directly to the leaf or frame.

The bolts 31, 32, 37 and 67 may have any form or structure suitable for obtaining the safety: straight-rectangular, straight-cylindric, simple or double hook, expansion, pivoting, massive or blade bolts, etc.

We now refer to FIGS. 4 through 6. In this embodiment the device provided for protecting the building from the danger of burglary through door breaking comprises a case 101 (FIG. 4) consisting of a case body 102 and a cover 103.

The case body is made of three parts, namely an upper part 104, a middle part 105 and a lower part 106. The three parts are constituted by a U-shaped cross-section member with a bottom portion 107 and wings 108 and 109.

Within the central part 105 there is lodged the lock proper 110 from which a bolt 111 and a half-turn 112 project; the latter elastically recedes and again projects when the leaf is turned into the frame; it is actuated by a handle to open the door. The bolt 111 traverses wing 108 through an aperture 113 and the half-turn 112 traverses said wing through an aperture 114.

From the lock body 110 upper 115 and lower 116 bars project; they move vertically when the lock is actuated by the key and cause horizontal displacement of an upper intermediary bolt 117 traversing wing 108 through aperture 118 and a lower intermediary bolt 119 traversing said wing through an aperture 120.

The bars 115 and 116 extend beyond the bolts 117 and 119 into portions 121 and 122.

Near its end the bar 121 is formed with a bore 125 (FIG. 5) in which there is a finger 126 integral with a rider 127 connecting the bar 121 to an upper bar 128 lodged in the upper part 104 of the case body and formed with an aperture 129 in which a finger 130 on the rider 127 engages.

Similar connection by a rider 131 is established between the lower part 122 of the bar 116 and a lower bar 132 lodged in the lower part 106 of the case body. Other means can be used to connect the central bar to the upper and lower bars.

The upper end of bar 128 is formed into a bolt 133 and the lower end of bar 132 is formed into a bolt 134.

Bolt 133 cooperates with a keeper body 135 that can be secured to the upper portion of the frame and lower bolt 134 cooperates with a keeper 136 that can be fixed to the floor.

The case cover 103 fits the case body 102; it is composed of an upper portion 141 and a lower portion 142 disposed in abutting relationship, each consisting of a U-shaped section having a bottom 143 and wings 144 and 145 and a bottom 146 and wings 147 and 148, respectively.

The wing 147 has an aperture 149 for passage of the bolt 111 and an aperture 150 for passage of half-turn 112. Said bolt 111 and an aperture 150 for passage of half-turn 112. Said wing has also an aperture 151 for passage of bolt 119. The wing 144 of the upper part 141 has an aperture 152 for passage of bolt 117.

Whatever be the height of the door, the same parts 104, 105 and 106 of a case body are used for fitting the door leaf. Bars 128 and 132 are cut to length by the workman.

Securement of the case body 102 to the leaf A is effected by means of screws 161 (FIG. 6) traversing bottom 107 applied to the face D of the leaf inside the building. The cover 103 is fixed to the case body 102 by screws 162 traversing wings 141, 142 of the cover and wings 109 of the case body. The other wing 144, 147 of the cover, longer than wing 141, 142, is fixed to the edge portion E of the leaf by screws 163.

The leaf fitting is also formed by a prismatic tubular body 170 made by assembling a first U-shaped section 171 (FIG. 1) to a wing 172 which is to be applied against the face G of the frame inside the building, said wing being longer than the opposite wing 173 to which it is connected by a bottom 174. The height of the section 171 is equal to the central portion 105 of the case body. The bottom 174 has an aperture for passing the bolt 111, an aperture 176 for the half-turn 112, an aperture 177 for the upper intermediary bolt 117 and an aperture 178 for the lower intermediary bolt 119.

The prismatic tubular body is completed by a cover 180, advantageously made of two parts, namely an upper part 181 and a lower part 182 of the same respective height than parts 141 and 142 forming the cover 103. Each part 181 and 182 consists of a U-shaped section with an outer wing 183 fixed to wing 172 by an angle portion 184 thereon by means of screws 185. The other, longer, wing 186 is secured to the edge F of the frame by screws 187. The wings 186 have apertures 188, 189, 190, 191 opposite to apertures 175, 176, 177, 178 resp.

Portions of U-shaped sections 192 and 193 resp. are secured to the ends of section 171 adjacent the upper keeper 135 and the floor respectively.

Section 171 can be used both with a door opening to the left hand side and a door opening to the right hand side, simply by reversing it upside down.

The sections 141 and 142 are available in a length larger than half the largest door height and the workman cuts them to the proper size as mentioned by the dotted lines.

We now refer to FIG. 7. In this form of embodiment, a horizontally sliding bolt, for instance the lock bolt 111, cooperates with a keeper block 201 mounted so as to be adjustable relative to its distance from the bottom 172 of section 171. To this end a recessed portion 202 in the bottom 172 has a hole 203 for passing a rod 204 with a head 205, a portion of which (206) is threaded, whereas the opposite portion 207 having a forward face 208 with a slot 209 passes through the other branch 173 of the section. The block 201 of a generally parallelepipedic rectangular form has a tapped portion 210 cooperating with the threading 206 so that by turning rod 204 by means of a screw-driver inserted in slot 209 one can vary the distance of the block 201 from wing 172, rotation of the block 201 being prevented by its face 211 abutting against the bot-

tom 176. A spring 212 is interposed between part 202 of wing 172 and face 213 of block 201.

In this way differences in contact between the inner faces D and G respectively of the leaf on the one hand and the frame on the other hand are compensated.

In the illustrated embodiment a gun 221 which is free to rotate is placed between cylinder 222 of the lock and the hole or chimney 223 made in the leaf A.

What I claim is:

1. A door locking device comprising:
  - an operating mechanism adapted to be actuated by a key;
  - a plurality of bolts vertically spaced over a distance substantially equal to the height of the door and being laterally movable between an unlocked position and a locked position wherein said bolts extend beyond the inner edge of the door;
  - transmission means connected between said operating mechanism and said bolts to move said bolts substantially simultaneously between said unlocked position and said locked position in response to manipulation of the key;
  - a first elongated case having a length substantially the same as the height of the door and housing said operating mechanism, said bolts and said transmission means;
  - said first case comprising openings for the passage of said bolts to said locked position;
  - means for securing said first case on the inner face of the door adjacent the inner edge thereof;
  - a second elongated case having a length substantially the same as the height of the door; and
  - means for securing said second case on the door frame adjacent the inner edge of the door;
  - said second case comprising keepers which, when said door is closed, are adapted to receive said bolts when they are moved to said locked position.
2. A device as claimed in claim 1, wherein said first case comprises a first piece substantially U-shaped in cross section, a second piece substantially U-shaped in cross section, and means connecting said first and second pieces.
3. A door locking device as claimed in claim 1, wherein said second case comprises a first piece substantially U-shaped in cross section, a second piece substantially U-shaped in cross section, and means for connecting together said first and second pieces.
4. A device as claimed in claim 2, wherein each of said pieces has a pair of substantially parallel arms, and one arm of one of said pieces is longer than the other arm so that when said first case is secured to the inner face of the door, the longer arm covers at least a part of the inner edge of the door.
5. A device as claimed in claim 3, wherein each of said pieces has a pair of substantially parallel arms, and one arm of one of said pieces is longer than the other arm, so that when said second case is attached to the door frame, the longer arm covers at least partially the edge of the frame opposite the inner edge of the door when the door is closed.
6. A locking device as claimed in claim 2, wherein said first case comprises a first piece substantially U-shaped in cross section receiving said operating mechanism, said bolts and said transmission means; said bolts comprise a first upper horizontally movable bolt, a second intermediate horizontally movable bolt and a third lower horizontally movable bolt; said transmission



7

means from said operating mechanism to said first bolt and said third bolt extending beyond said first and third bolts to the ends of said first piece, a second upper piece substantially U-shaped in cross-section extending the first piece and abutting against the latter, a fourth vertically movable bolt housed in the upper end of said second piece and connected to said transmission means, a third lower piece substantially U-shaped in cross section extending the first piece and abutting against the same, a fifth vertically movable bolt housed in lower end of the third piece and connected to said transmission means, and a section covering said first, second and third pieces to form said first case with same.

7. A locking device as claimed in claim 3, wherein said second case comprises a first piece substantially U-shaped in cross section and comprising a central keeper, an upper keeper and a lower keeper adapted to cooperate with said laterally movable bolts, and a U-shaped section disposed over said first piece to form

8

said second case with same, the height of said section being greater than that of said first piece and being substantially the same as the height of the door on which the locking device is mounted.

8. A locking device as claimed in claim 7, further comprising second and third pieces having substantially the same cross section as the first piece and being adapted to cover the upper end and the lower end respectively, of the door frame.

9. A locking device as claimed in claim 6, wherein said transmission means comprises a portion housed in the second piece and a portion housed in the third piece, said portions being connected to the transmission means housed in the first piece by detachable riders.

10. A locking device as claimed in claim 1, wherein said keepers in said second case are adjustable relative to the portion of said second case in contact with the door frame.

\* \* \* \* \*

25

30

35

40

45

50

55

60

65