United States Patent [19]

Prohaska

[11] **3,911,622**

[45] **Oct. 14, 1975**

[54] **DOOR SECURITY SYSTEM AND METHOD OF ATTACHING IT**

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[22] Filed: **Aug. 12, 1974**

[21] Appl. No.: **496,675**

[52] **U.S. Cl.** **49/383;** 16/137; 292/300

[51] **Int. Cl.**[2] **E05D 11/00;** E06B 7/16

[58] **Field of Search**..... 16/137, 135, 128 R, 148; 292/DIG. 17, 300; 49/383, 381, 398, 399

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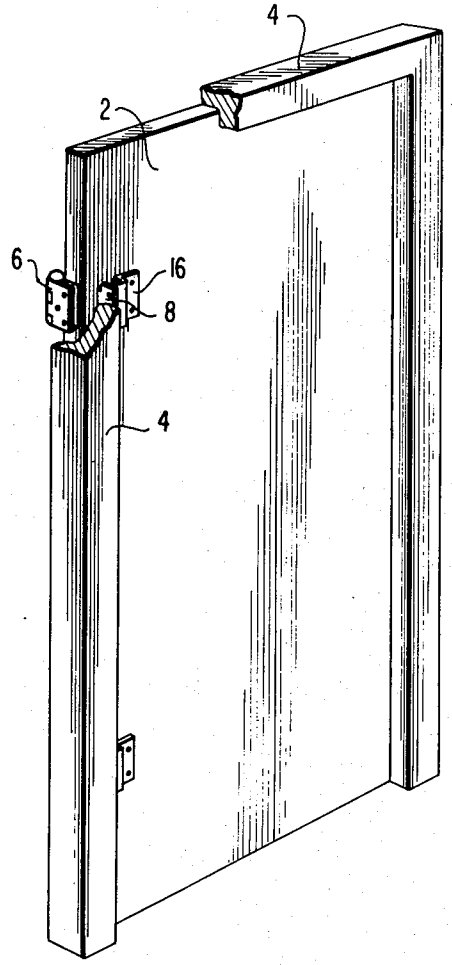
Primary Examiner—George V. Larkin
Attorney, Agent, or Firm—Browne, Beveridge, DeGrandi & Kline

[57] **ABSTRACT**

A security system prevents a door from being pulled from a doorframe after removal of the door hinge connection. When the door is closed, a stationary abutment projecting laterally into the door opening from the doorframe overlies a movable abutment affixed to the door. As the door opens, the movable abutment passes through an intermediate position where its extreme portion lies substantially parallel to the extreme portion of the stationary abutment.

A method is disclosed for mounting the security system by positioning the stationary abutment against the door and positioning the movable abutment against the base of the stationary abutment member.

13 Claims, 6 Drawing Figures



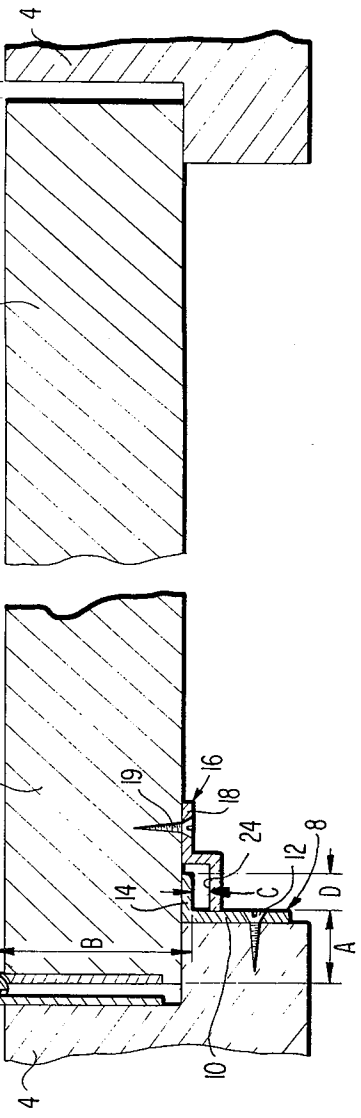


FIG. 2

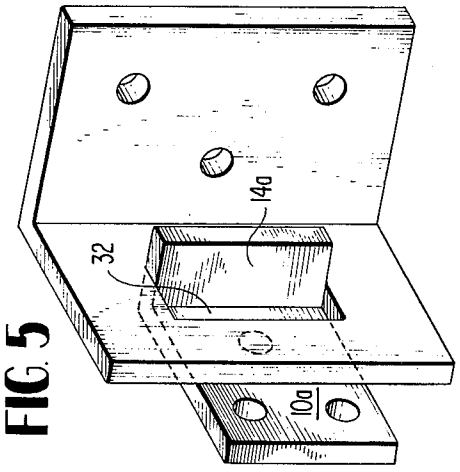


FIG. 5

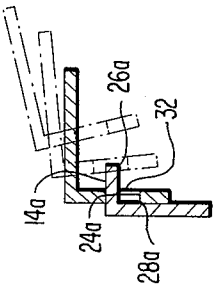


FIG. 6

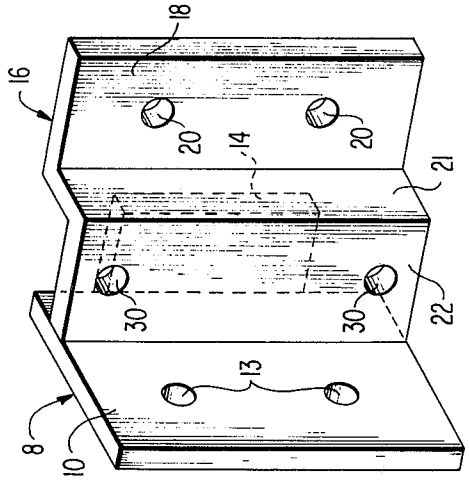


FIG. 3

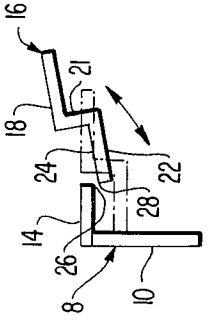


FIG. 4

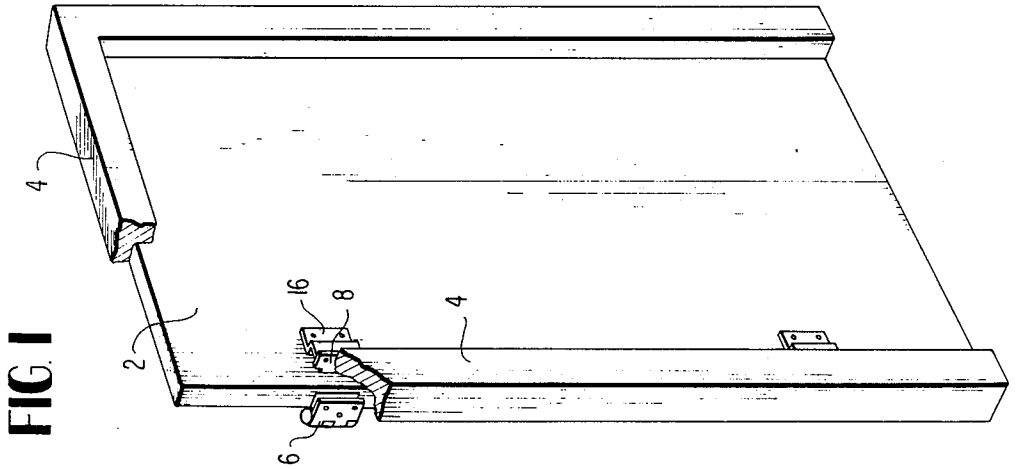


FIG. 1

DOOR SECURITY SYSTEM AND METHOD OF ATTACHING IT

This invention relates to a door security system and a method of attaching it to a door, whereby the security system will prevent the door from being pulled from a doorframe after removal of the door hinge connection.

Prior to this invention, it has been recognized that locks mounted on the swinging edge of a door do not provide complete security. Hinge plates or hinge pins can be removed from the exterior side of a door, and the door pulled out of its opening to gain access to the interior side of the door. As used in this description, the terms "interior" and "exterior" refer respectively to the un-authorized area and the authorized area on opposite sides of the door, and do not require that one side of the door is open to the weather and that the other side of the door is the interior of a building structure. Both sides of the door may be either inside or outside a building structure, depending upon the particular circumstances.

Heretofore, door security systems of this type have taken many forms, one being to construct the hinge in a manner so that its pintle cannot be removed, another being to provide interfitting leaves on the hinge so that they cannot be slid with respect to each other, and in some cases separate interfitting members have been mounted on the interior side of the door and doorframe. Examples of the latter are disclosed in the U.S. Pat. Nos. **1,111,135; 1,391,304;** and, **2,797,432.**

One objective of the present invention is to provide for an uncomplicated and inexpensive security system, readily mounted by the layman and being dimensionally arranged so that minimum carpentry and measurement skills are required for its installation. Another object is to provide a method for mounting such a security system whereby the parts are relatively positioned by abutment against the door, the doorframe and themselves so as to minimize the criticality of installation measurements which characterize the prior art.

Although the invention may take many forms, only two embodiments are illustrated in the accompanying drawings which are set forth only by way of example rather than limitation.

In the drawings,

FIG. **1** shows a perspective view of a door positioned in a doorframe and having the security system of this invention, a portion of the doorframe being broken away for purposes of illustration;

FIG. **2** is a plan view of the preferred embodiment of the invention showing the door in its closed position and illustrating some of the significant dimensions which are involved in the preferred embodiment of the invention;

FIG. **3** is a perspective view of a security plate system constructed according to a preferred embodiment of the invention;

FIG. **4** is a diagrammatic plan view showing the elements of FIG. **3** when in the door-closed position and in their intermediate position as the door swings toward its open position;

FIG. **5** is a view similar to FIG. **3** of a second embodiment of the invention wherein an apertured plate forms an abutment portion of the movable member, and,

FIG. **6** is a diagrammatic sectional view of the system of FIG. **5,** showing the movable plate in its door-closed position, its intermediate position and its door-opened position.

Referring to FIG. **1,** it will be seen that a door **2** is positioned in and connected to a doorframe **4** by a plurality of hinges, one being illustrated at **6.** In the usual fashion, the hinges connect the door to the frame for pivotal movement about a hinge axis which is located on the exterior side of the door. This permits movement of the door from the illustrated closed position where it lies parallel to the frame to an open position where it is angularly disposed with respect thereto.

According to the preferred embodiments of the invention, the stationary member **8** mounted on the doorframe **4** has a flat base portion **10** which is adapted to lie against the doorframe on the interior side of the door. The stationary plate is held in position on the doorframe by screws **12** (FIG. **2**) which are received by mounting holes **13** shown in FIG. **3.** The stationary member **10** has an abutment portion **14** which extends laterally from the doorframe into the opening on the interior side of the door **2.** In the embodiments of FIGS. **1–4,** the stationary abutment portion **14** abuts the interior face of the door when the door is in its closed position.

A movable member **16** is attached to the door **2** for swinging movement therewith. The movable member **16** is Z-shaped having a base **18** mounted on the door by screws **19** which are received in the mounting holes **20.** An offset midportion **21** lies perpendicular to the door and connects the base **18** to the movable abutment portion **22** of the member **16.** The movable abutment portion has a surface **24** which is in facing relationship to the interior side of the door where it will overlap the interior side of the stationary abutment portion **14** when the door is in its closed position. Such a relationship is illustrated in solid lines in FIG. **2** and in broken lines in FIG. **4.** Of course, with this arrangement, the removal of the hinge pin or one of the hinge leaves from a door will not enable unauthorized entry into the interior space, inasmuch as the movable abutment **22** will engage against the stationary abutment **14** before the door removal can be effected.

The preferred position of the movable abutment **22** is in abutting relationship with the base **10** of the stationary member **8.** This minimizes lateral movement of the door within the frame, and it is also important from the standpoint of ease of installation of the device which is described later in this specification.

The presence of the security system will have no effect on the normal opening and closing of the door. This is because the movable abutment **22** swings clear of the stationary abutment **14** as illustrated in FIG. **4** where the extreme edge portion **26** of the stationary abutment is parallel and proximate to the extreme edge portion **28** of the movable abutment surface.

The construction shown in the preferred embodiments of the invention also minimizes the extent of vertical movement between the door and its frame after the hinge connection is removed. In FIG. **3,** it will be observed that the stationary abutment portion is vertically foreshortened relative to the movable abutment portion **22.** Screws or other fasteners are driven into the door through the apertures **30** at positions which lie closely adjacent, both above and below, the stationary abutment member **14.** These fasteners impose a limitation on the relative vertical movement between the elements.

The secondary embodiment of the invention illustrated in FIGS. **5** and **6** operates on the same principle as the previously discussed embodiment of the invention. However, in the instance of FIGS. **5** and **6**, the movable abutment is formed by an aperture in an interiorly projecting flange on the movable member. This aperture, designated **32**, receives a stationary abutment **14***a* which is mounted on the doorframe by means of fasteners extending through the base **10***a*. The abutment surface in this embodiment is shown in FIG. **6** at **24** *a* and its extreme edge portion **28***a* will lie proximate and parallel to the extreme edge portion **26***a* of the stationary abutment **14***a* when the members are in their intermediate position.

The relationship between the dimensions of the various elements is important from a standpoint of satisfactory operation and ease of installation. As illustrated in FIG. **4**, it is preferable that the distance between the stationary abutment and the movable abutment be approximately equal to the amount by which these abutment portions overlap each other laterally when the door is in its closed position. This distance is preferred to be about one-forth inch for most installations, and most suitably is in the range of about three-sixteenths to three-eighths inch.

A relationship also exists between the position of the elements and the hinge axis between the door and doorframe. Referring to FIG. **2**, it will be seen that the dimension A is the distance from the hinge axis to the base portion of the stationary member, measured parallel to the plane of the opening of the doorframe. B denotes the distance from the hinge axis to the interior face of the stationary abutment portion **14**, measured perpendicular to the plane of the opening of the doorframe. C indicates the distance between the exterior face of the stationary abutment portion **14** and the movable abutment surface **24**, measured perpendicular to the plane of the opening of the doorframe. D is the distance between the base **10** of the stationary member **8** and the extreme portion **26** of the stationary abutment **14**, measured parallel to the plane of the opening of the doorframe.

When the device is installed as illustrated, so that the extreme portion of the movable member is in abutment with the base **10** of the stationary member **8**, the following relationship exists for both illustrated embodiments of the invention:

$A^2 + (B + C)^2$ is at least as great as $B^2 + (A + D)^2$.

The distance by which the movable abutment surface **24** overlies the stationary abutment **14** when the door is closed (*D* when the abutment **22** is in contact with base **10**) should be greater than the clearance space *Y* between the swinging edge of the door and the doorframe.

One significant feature of these dimensions is that it will permit a carpenter or homeowner easily to install the system of this invention. This is because the movable member is positioned simply by bringing it into abutment with the base of the stationary member. In the embodiment of FIGS. **1–4**, installation is also simplified because the position of stationary member **8** is established by brining the abutment **14** into abutting relation with the interior face of the door.

When mounting the system of FIGS. **1–4**, the door is preliminary in its closed position and the stationary member is placed in contact with the doorframe and the interior face of the door to establish the final position of the stationary abutment. The base of the stationary member is affixed to the doorframe in this established position. Next, the door is again closed and the movable abutment is placed in contact with the door and the base of the stationary abutment to establish the final position of the movable member. The movable member is then affixed to the door in its final position. This is repeated for each security system installed on the door, one such system preferably being horizontally aligned with each of the hinges.

As previously mentioned, the invention may take numerous form which differ in construction and appearance from the illustrated embodiments. Therefore, it is to be kept in mind that the invention is not limited only to the disclosed embodiments but encompasses variations thereof and modification thereto which fall within the spirit of the claims which follow.

I claim:

1. A security system for preventing removal of a hinged door from an opening in a doorframe upon removal of a hinge connection between the door and the doorframe, said security system comprising,

a stationary member having a base portion and a stationary abutment portion projecting from the base portion, said stationary abutment portion having a stationary abutment surface, means for mounting the base portion of the stationary member on a doorframe interiorly of the door at a position where the stationary abutment portion extends laterally from the doorframe into the opening on the interior side of the door,

a movable member having a movable abutment surface which is in facing relationship to the interior side of the door, means for mounting the movable member on the interior face of a door at a position fixed with respect to the door where the movable abutment surface overlaps the interior side of the stationary abutment portion when the door is in its closed position to prevent the hinged edge of the door from being pulled in an exterior direction when the hinge connection is removed therefrom; said movable abutment surface being movable with the door upon opening of the door from a closed position, past an intermediate position when the spacing between said stationary abutment portion and the movable abutment surface is at a minimum, to a door-open position laterally displaced from the stationary abutment, said abutment surfaces having extreme portions which lie substantially parallel to each other when the door is at said intermediate position.

2. The security system of claim **1** wherein the movable abutment surface is spaced about one-fourth to one-half inch from the stationary abutment portion when the door is in its closed position.

3. The security system of claim **1** wherein the extreme portion of the movable abutment surface abuts the base portion of the stationary member when the door is in a closed position.

4. The security system of claim **3** wherein the distance by which the outer portion of the movable abutment surface overlies the stationary abutment portion is substantially equal to the distance between the stationary abutment portion and the movable abutment surface when the door is in its closed position.

5. An assembly for preventing a door from being removed from a doorframe upon removal of a hinged

connection between the door and the doorframe, comprising, a doorframe forming an opening,

a door positioned in the opening of the doorframe, said door having a hinge connecting the door to the doorframe, said hinge having a hinge axis located on the exterior side of the door to permit movement of the door from a closed position where it lies parallel to the frame to an open position where it is angularly disposed to the frame to permit ingress and egress through the opening in the doorframe,

the improvement which comprises a security system having a stationary member mounted on the frame on the interior side of the door and a movable member affixed to the interior face of the door,

said stationary member having a base portion and a stationary abutment portion projecting from the base portion, said stationary abutment portion extending laterally from the doorframe into the opening on the interior side of the door, said stationary abutment portion having a stationary abutment surface,

said movable member having a movable abutment surface which is in facing relationship to the interior side of the door and overlaps the interior side of the stationary abutment portion when the door is in its closed position to prevent the hinged edge of the door from being pulled in an exterior direction when the hinge connection is removed therefrom; said movable abutment surface being movable with the door upon opening of the door from a closed position, past an intermediate position where the spacing between said stationary abutment portion and the movable abutment surface is at a minimum, to a door-open position laterally displaced from the stationary abutment, said abutment surfaces having extreme portions which lie substantially parallel to each other when the door is at said intermediate position.

6. The security system of claim **5** wherein the movable abutment surface is spaced about one-fourth to one-half inch from the stationary abutment portion when the door is in its closed position.

7. The assembly of claim **5** wherein the door has a swinging edge opposed from the pintle, said swinging edge being spaced from the frame by a clearance distance measured parallel to the plane of the opening, said movable abutment surface overlying the stationary by a given lateral distance greater than said clearance distance, said given distance being measured parallel to the plane of the opening.

8. The security system of claim **5** wherein the extreme portion of the movable abutment surface abuts the base portion of the stationary member when the door is in a closed position.

9. The security system of claim **8** wherein the distance by which the outer portion of the movable abutment surface overlies the stationary abutment portion is substantially equal to the distance between the stationary abutment portion and the movable abutment surface when the door is in its closed position.

10. The assembly of claim **8** wherein the following relationship exists:

$A^2 + (B + C)^2$ is at least as great as $B^2 + (A + D)^2$; where A is the distance from the hinge axis to the base portion of the stationary member, measured parallel to the plane of the opening of the doorframe;

B is the distance from the hinge axis to the interior face of the stationary abutment portion, measured perpendicular to the plane of the opening of the doorframe;

C is the distance between the exterior face of the stationary abutment portion and the movable abutment surface, measured perpendicular to the plane of the opening of the doorframe; and,

D is the distance between the base portion of the stationary member and the extreme portion of the stationary abutment portion, measured parallel to the plane of the opening of the doorframe.

11. The assembly of claim **5** wherein the stationary abutment portion of the stationary member abuts the interior face of the door when the door is in its closed position.

12. The assembly of claim **11** wherein the extreme portion of the movable abutment surface abuts the base portion of the stationary member when the door is in its closed position.

13. A method of mounting a security system on a door located in a doorframe, said security system having a stationary abutment attached to a base mountable on the doorframe, and a movable abutment mountable on the door to overlie the stationary abutment when the door is in its closed position and to swing with the door to a position laterally displaced from the stationary abutment, said mounting method comprising the steps of placing the door in its closed position, placing the stationary abutment in contact with the doorframe and the door in its closed position to establish the final position of the stationary abutment, affixing the base of said stationary abutment in its final position to the doorframe, placing the movable abutment in contact with the door and the bases of the stationary abutment to establish the final position of the movable abutment, and affixing the movable abutment in its final position to the door.

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