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**UNITED STATES DISTRICT COURT
WESTERN DISTRICT OF MICHIGAN**

THE LOCKOUT CO., LLC

and

ROBERT COUTURIER

Plaintiffs,

v.

LEGACY BARRICADES, INC.,

Defendant.

CASE NO.:

**COMPLAINT FOR DIRECT AND
INDIRECT INFRINGEMENT OF
UNITED STATES PATENT 10,174,532**

DEMAND FOR JURY TRIAL

NOW COME Plaintiffs THE LOCKOUT CO., LLC ("LOCKOUT") and ROBERT COUTURIER (collectively referred to herein as "Plaintiffs"), by and through their attorneys, and for their Complaint against LEGACY BARRICADES, INC. ("LEGACY"), state as follows:

INTRODUCTION

1. This case arises out of LEGACY’S direct and indirect infringement of United States Patent No. 10,174,532 for “Door Security System and Method of Using Same” (“the ‘532 Patent”). A copy of the ‘532 Patent is attached as Exhibit A.

2. LEGACY is selling, and offering for sale, a door barricade system, branded under the name LEGACY BARRICADES name, which directly infringes one or more the ‘532 Patent (“the Legacy Product”).

1 Product within this judicial District. LEGACY has purposefully directed its activities to this State
2 and this District and/or purposefully availed itself of this jurisdiction.

3 10. This Court has personal jurisdiction over LEGACY for the reasons identified
4 above and according to the laws of the United States.

5 **FACTS COMMON TO ALL COUNTS**

6 11. The '532 Patent issued on January 8, 2019.

7
8 12. Plaintiff ROBERT COUTURIER is president of Plaintiff LOCKOUT and the
9 owner of the entire right, title, and interest in and to the '532 Patent.

10 13. Plaintiff LOCKOUT is the exclusive licensee of the '532 Patent.

11 14. The '532 Patent's claims protect a door security system and its method of use.

12 15. LOCKOUT is a leading manufacturer of security and safety products, including a
13 door security system sold and marketed under the trademark THE BOOT™. THE BOOT™
14 product is designed to be positioned so as to block operation of a door, such as to secure a room
15 from the inside against unwanted entry. THE BOOT™ product includes a novel release
16 mechanism whereby the door can be unblocked from the opposite side of the blocked door.
17

18 16. LOCKOUT'S THE BOOT™ product, as well as the use thereof, is comprehended
19 by the '532 Patent.

20 17. LOCKOUT has invested significant time and resources into developing its
21 patented THE BOOT™ product.
22

23 18. LOCKOUT has realized commercial success from its THE BOOT™ products,
24 which are widely used in institutional buildings, such as schools, throughout the country. THE
25 BOOT™ products enjoy an excellent reputation among LOCKOUT'S customers.
26
27
28

1 19. LEGACY is a competitor of LOCKOUT in the market for security and safety
2 products.

3 20. As stated above, LEGACY is selling, and offering for sale, a door barricade
4 system, branded under the name LEGACY BARRICADES and referred to herein as the Legacy
5 Product.

6 21. LEGACY offers to sell, and sells, the infringing Legacy Product to customers in
7 the United States.

8 22. On information and belief, including from the public statements of LEGACY and
9 its representations to customers and prospective customers, the Legacy Product is comprehended
10 by the disclosure of United States Patent No. 11,105,130, which is assigned to LEGACY (“the
11 ‘130 Patent”). The ‘130 Patent was filed after the ‘532 Patent. A copy of the ‘130 Patent is
12 attached as Exhibit B.
13

14 23. The ‘130 Patent describes a door lock system and method utilizing a “lock
15 removal tool” to disengage the lock system. The following excerpt from the ‘130 Patent
16 describes that “lock removal tool”:
17

18 Optionally, a lock or lock pin removal tool 176, such as illustrated in FIG. 12, is
19 configured to assist emergency personnel in removing the lock system 10 when the lock
20 system 10 is installed on a door 22 that swings in toward the lock pin 18, wherein the
21 lock system 10 would impede the door 22 from opening unless the lock pin 18 is
22 disengaged from the floor. The lock removal tool includes a main shaft 178 and at least
23 one leg 180 perpendicularly fixed to the main shaft 178. Preferably, the lock removal tool
24 176 is formed from a single elongated piece of material with a perpendicular bend
25 between the main shaft 178 and the at least one leg 180. As illustrated in FIGS. 13A and
26 13C, after sliding the u-brackets 16 outward, an emergency personnel 182, from the
27 exterior of the door, inserts the lock removal tool 176 between the door 22 and the floor
28 toward the lock pin 18 on the interior of the door 22. Once the leg 180 is clear of the
interior face of the door 22, the emergency personnel 182 turns the main shaft 178 to lift
the leg 180, as such lifting the interior bracket 12 and lock pin 18 out of the floor. As
illustrated in FIGS. 13B and 13D, the lock removal tool 176 is inserted under the door
until the leg 180 is clear of the interior face of the door, the emergency personnel 182

1 turns the main shaft 178, wherein the leg 180 lifts the interior bracket 12 and the lock pin
2 18 out of the floor, allowing the door 22 to open inward.

3 24. Based on available information, including as identified herein, the Legacy Product
4 includes the lock removal tool as described above.

5 25. The Legacy Product as described herein, as well as its manner of use, directly
6 infringes one or more claims of the '532 Patent.

7 26. On April 12, 2022, counsel for Plaintiffs wrote to LEGACY to advise that the
8 Legacy Product infringed one or more claims of the '532 Patent.

9 **FIRST CAUSE OF ACTION:**
10 **VIOLATION OF 35 U.S.C. § 271 –**
11 **DIRECT INFRINGEMENT OF THE '532 PATENT**

12 27. Plaintiffs incorporates the above paragraphs as though fully set forth herein.

13 28. In violation of 35 U.S.C. § 271, LEGACY has infringed and continues to infringe,
14 literally or under the doctrine of equivalents, at least claim 1 of the '532 Patent by one or more of
15 the acts of making, using, selling, or offering for sale within the United States, or importing into
16 the United States, the Legacy Product.

17 29. In satisfaction of at least claim 1 of the '532 Patent, the Legacy Product provided
18 by LEGACY to its customers is, on information and belief, characterized by the following
19 features, either literally or under the doctrine of equivalents: (i) A security apparatus comprising
20 a floor engaging portion and a door blocking portion, the security apparatus being provided in a
21 first space adjacent to a first side of the door, the door blocking portion configured to block the
22 door from opening into the first space, the floor engaging portion configured to engage a floor
23 provided in the first space in a manner which retains the security apparatus in place relative to the
24 floor, the floor extending into the first space and a second space; and (ii) a release mechanism
25 comprising a handle portion and a security apparatus engaging portion, the handle portion being
26
27
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1 configured to be manipulated by a user in the second space adjacent to a second side of the door,
2 the security apparatus engaging portion being connected to the handle portion and configured to
3 be extended by the user into the first space through a slot provided between a bottom of the door
4 and the floor, the handle portion configured to be manipulated by the user to cause the security
5 apparatus engaging portion to engage the security apparatus in a manner which causes the floor
6 engaging portion to disengage from the floor such that the door is no longer blocked from opening
7 into the first space.
8

9 30. As a direct and proximate consequence of LEGACY'S complained-of
10 infringement, Plaintiffs have been, are being, and, unless such acts and practices are enjoined by
11 the Court, will continue to be injured in their business and property rights, and have suffered, are
12 suffering, and will continue to suffer injury and damages for which they are entitled to relief under
13 35 U.S.C. § 284 adequate to compensate for such infringement, including lost profits, but in no
14 event less than a reasonable royalty.
15

16 31. Plaintiffs are entitled to and claim all damages allowable by law, including
17 injunctive relief, adequate compensation for the infringement, costs, interest, attorney fees, and
18 for the sales of infringing product as well as the sales of any accessory/ancillary products.
19

20 32. LEGACY'S complained-of infringement is further causing, and will continue to
21 cause, Plaintiffs irreparable harm, for which there is no adequate remedy at law. Unless and until
22 enjoined by this Court, LEGACY will continue to infringe the '532 Patent. Under 35 U.S.C. §
23 283, Plaintiffs are entitled to an injunction against further infringement.
24

25 33. LEGACY'S infringement as complained of herein was undertaken without
26 permission or license under the '532 Patent.
27
28

1 apparatus in a manner which causes the floor engaging portion to disengage from the floor in the
2 first space such that the door is no longer blocked from opening into the first space.

3 39. LEGACY has known of the '532 Patent since prior to August 31, 2021, which is
4 the issue date of the '130 Patent. More specifically, the '532 Patent was cited by the United
5 States Patent and Trademark Office during prosecution of the '130 Patent.

6 40. On information and belief, LEGACY intentionally took actions that induced
7 others, including at least its customers and other end-users of the Legacy Product, to directly
8 infringe the '532 Patent, with knowledge that such inducement would result in direct
9 infringement of the '532 Patent.
10

11 41. LEGACY'S actions demonstrate an intent to cause the acts that form the basis of
12 the direct infringement.

13 42. As a direct and proximate consequence of LEGACY'S complained-of indirect
14 infringement, Plaintiffs have been, are being, and, unless such acts and practices are enjoined by
15 the Court, will continue to be injured in their business and property rights, and have suffered, are
16 suffering, and will continue to suffer injury and damages for which they are entitled to relief
17 under 35 U.S.C. § 284 adequate to compensate for such infringement, including lost profits, but
18 in no event less than a reasonable royalty.
19

20 43. Plaintiffs are entitled to and claim all damages allowable by law, including
21 injunctive relief, adequate compensation for the infringement, costs, interest, and attorney fees.
22

23 44. LEGACY'S complained-of infringement is further causing, and will continue to
24 cause, Plaintiffs irreparable harm, for which there is no adequate remedy at law. Unless and until
25 enjoined by this Court, LEGACY will continue to indirectly infringe the '532P Patent. Under 35
26 U.S.C. § 283, Plaintiffs are entitled to an injunction against such further infringement.
27
28

- 1 e) Declare this an exceptional case within the meaning of 35 U.S.C. § 285 and that
2 Plaintiffs be awarded attorney’s fees, costs, and expenses incurred in connection
3 with this action;
4 f) Award Plaintiffs the costs associated with bringing this action; and
5 g) Award Plaintiffs any further relief that this Court deems just and proper.
6

7 Dated: May 8, 2022

DICKINSON WRIGHT PLLC

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14 *Attorneys for Plaintiffs The Lockout Co., LLC and
15 Robert Couturier*

16 **DEMAND FOR JURY TRIAL**

17 Plaintiffs demand a jury trial as to all claims and issues that are triable by jury in this
18 action.

19 Dated: May 8, 2022

DICKINSON WRIGHT PLLC

20 By: /s/Chris Mitchell
21 Christopher A. Mitchell, Esq.

22 *Attorneys for Plaintiffs The Lockout Co., LLC and
23 Robert Couturier*

EXHIBIT A



(12) **United States Patent**
Couturier

(10) **Patent No.:** **US 10,174,532 B2**
(45) **Date of Patent:** **Jan. 8, 2019**

(54) **DOOR SECURITY SYSTEM AND METHOD OF USING SAME**

(71) Applicant: **Robert J. Couturier**, Williamston, MI (US)

(72) Inventor: **Robert J. Couturier**, Williamston, MI (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 736 days.

(21) Appl. No.: **14/253,268**

(22) Filed: **Apr. 15, 2014**

(65) **Prior Publication Data**
US 2014/0306466 A1 Oct. 16, 2014

Related U.S. Application Data

(60) Provisional application No. 61/812,410, filed on Apr. 16, 2013.

(51) **Int. Cl.**
E05C 19/18 (2006.01)

(52) **U.S. Cl.**
CPC **E05C 19/184** (2013.01); **Y10T 292/65** (2015.04)

(58) **Field of Classification Search**
CPC . Y10T 292/34; Y10T 292/37; Y10T 292/373; Y10T 292/379; Y10T 292/388; Y10T 292/391; Y10T 292/394; Y10T 292/397; Y10T 292/65; Y10T 292/67; Y10S 292/15; Y10S 292/65; E05C 19/18; E05C 19/184; E05C 19/188; E05C 17/02; E05C 17/44; E05C 17/446; E05C 17/46; E05C 17/48; E05C 17/54; E05F 5/02
USPC 16/82, 83; 248/351
See application file for complete search history.

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Primary Examiner — Alyson M Merlino
(74) *Attorney, Agent, or Firm* — Northern Michigan Patent Law, PLC

(57) **ABSTRACT**

A door security system is provided which is used to prevent a door, which separates first and second spaces, from opening. The door security system includes a security apparatus which is configured to be engaged with the floor within a first space. If the door is to be opened into the first space, the security apparatus blocks the door from opening into the first space. If the door is to be opened into the second space, an attachment assembly of the door security system acts in concert with the attachment assembly to block the door from opening into the second space. The door security system further includes a release mechanism which can be manipulated from the second space to disengage the security apparatus within the first space, thereby allowing for the door to be opened into either the first or second spaces, as appropriate.

19 Claims, 32 Drawing Sheets

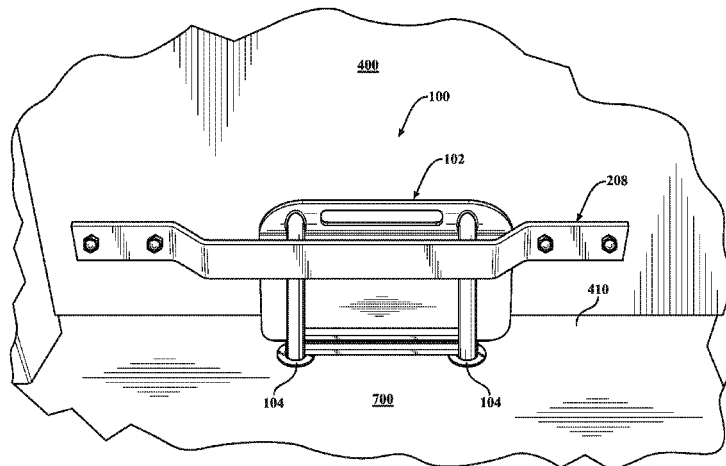


FIG. 1

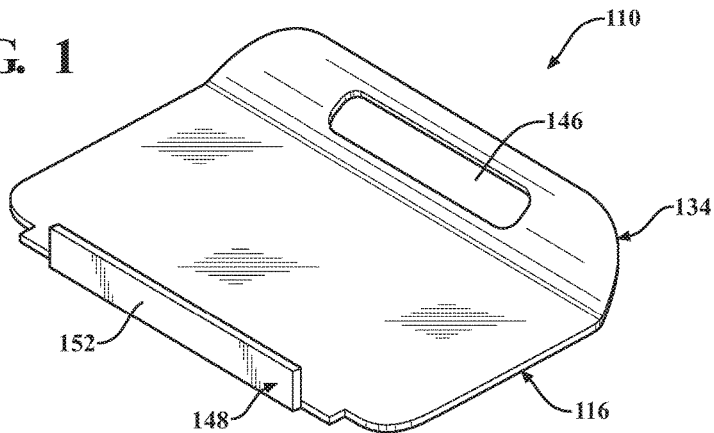


FIG. 2

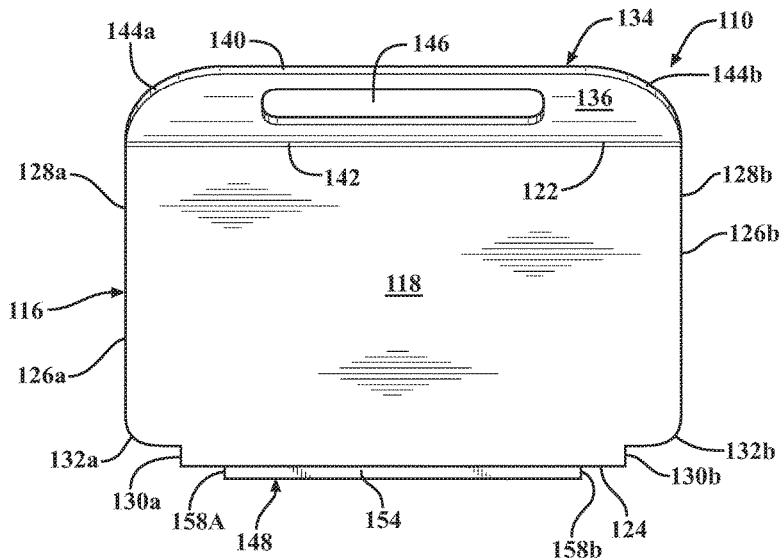
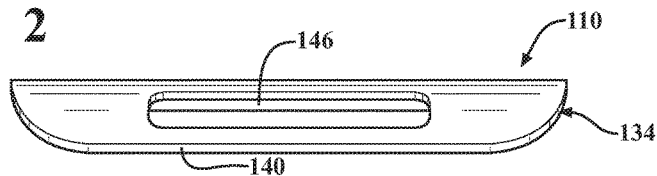


FIG. 3

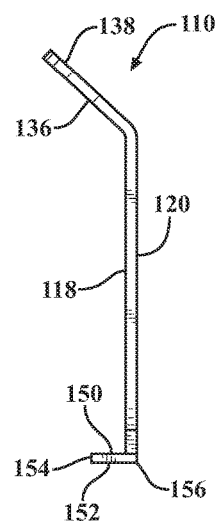


FIG. 4

FIG. 5

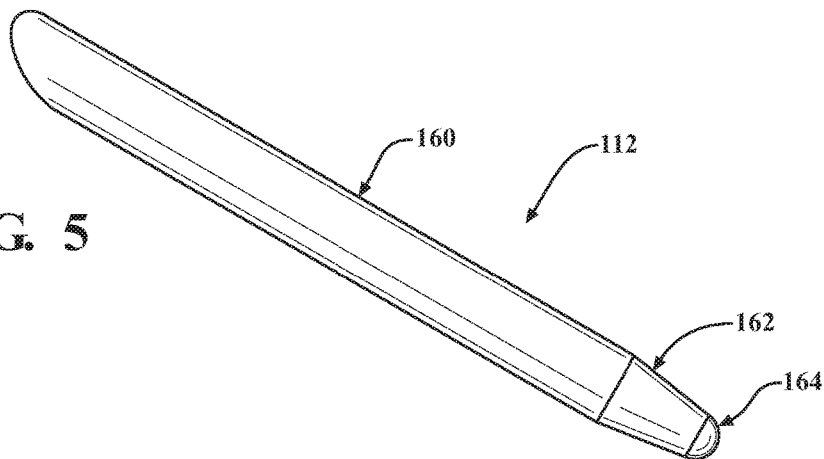


FIG. 6

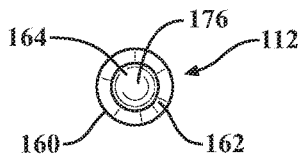
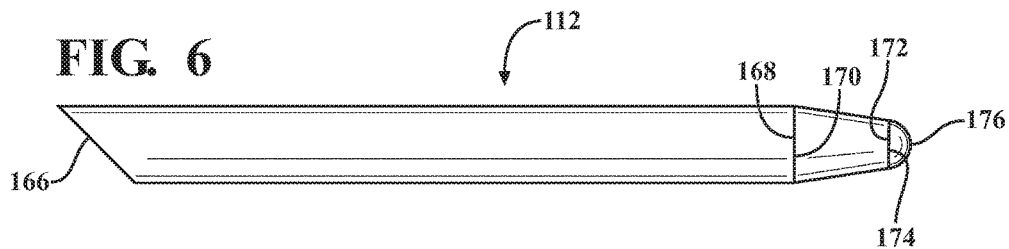


FIG. 7

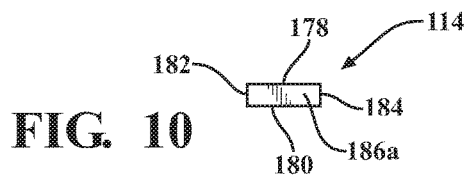
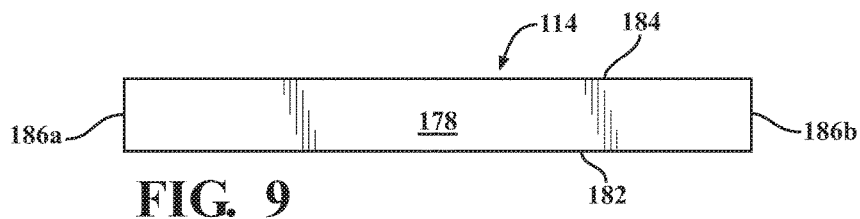
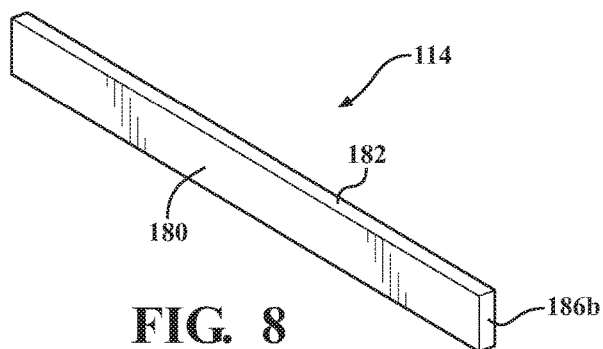


FIG. 11

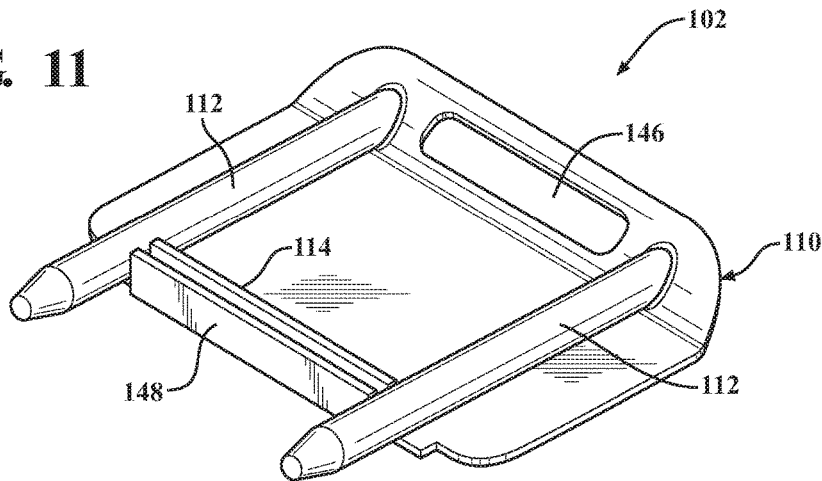


FIG. 12

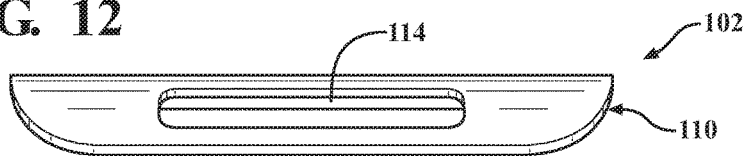


FIG. 13

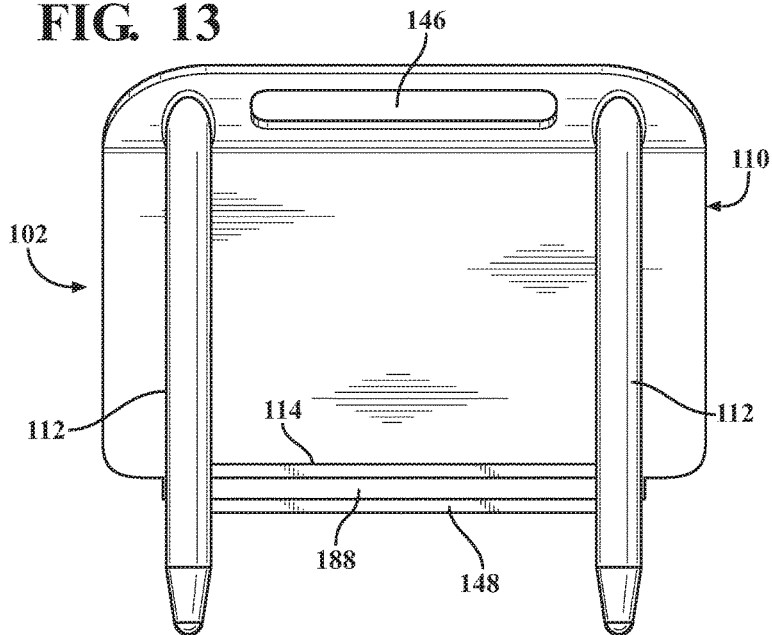
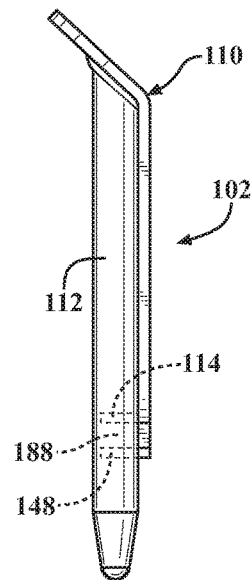
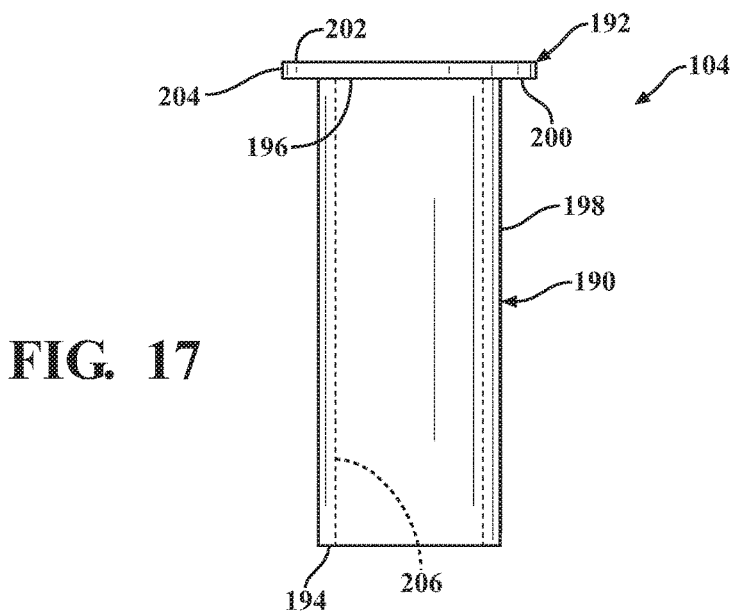
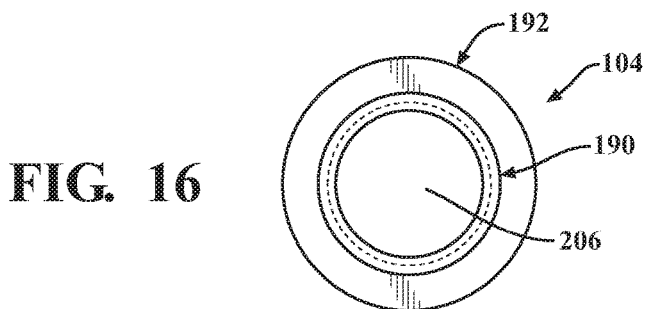
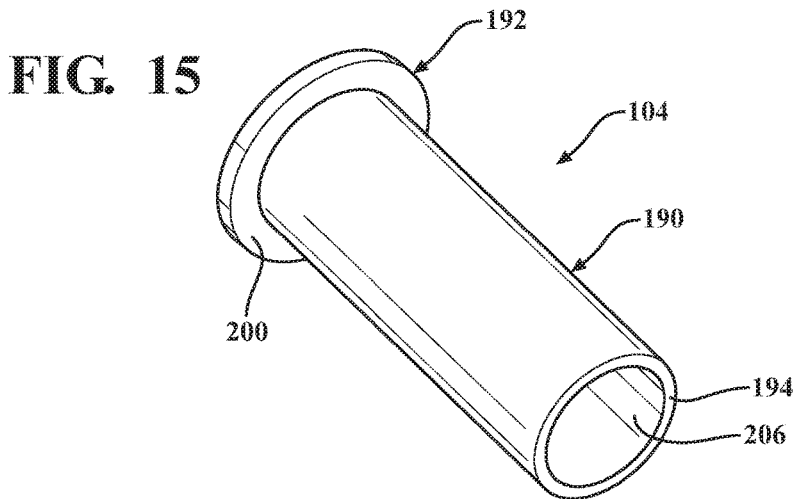


FIG. 14





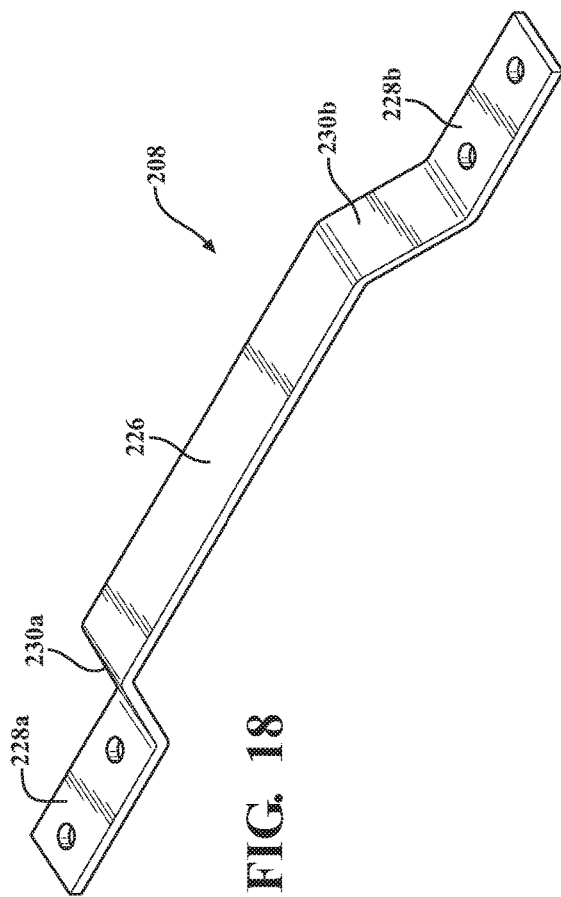


FIG. 18

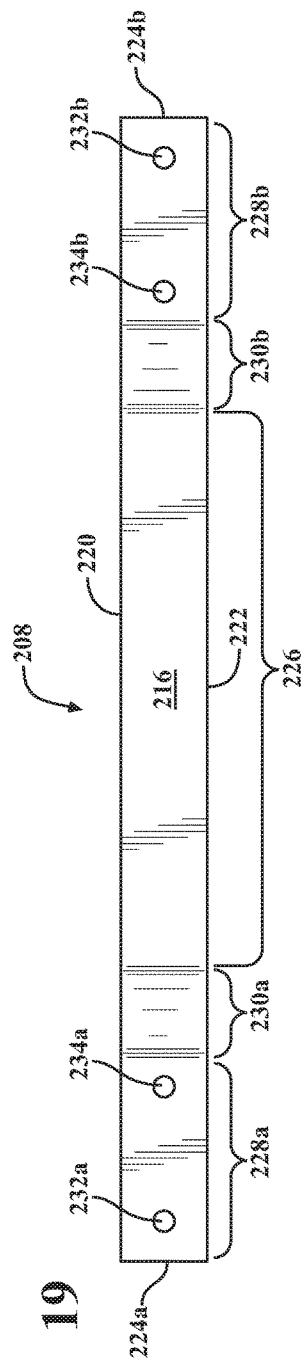


FIG. 19

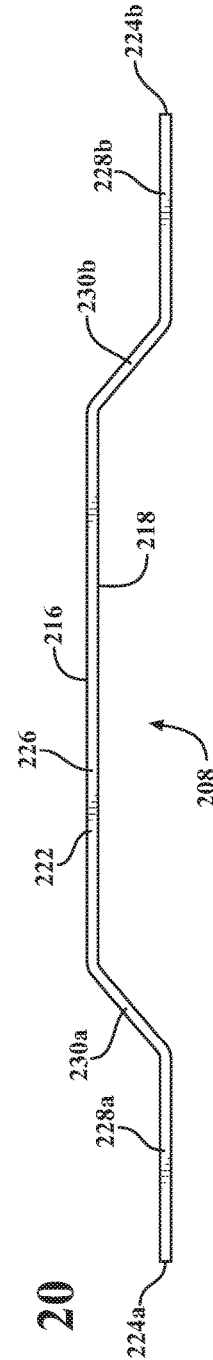


FIG. 20

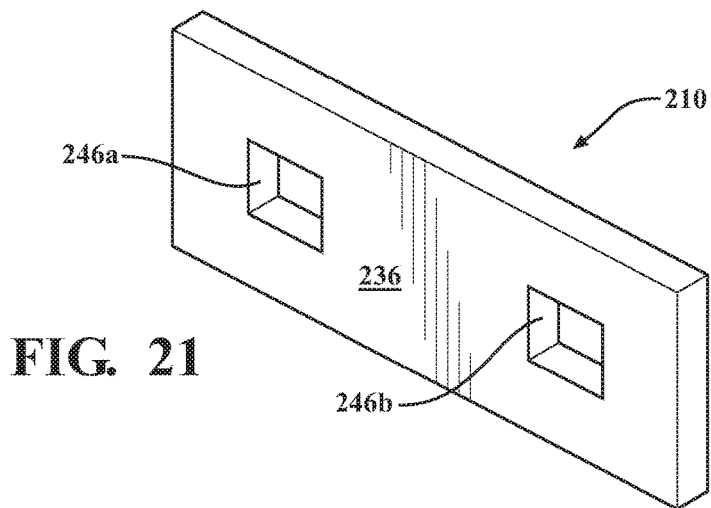


FIG. 21

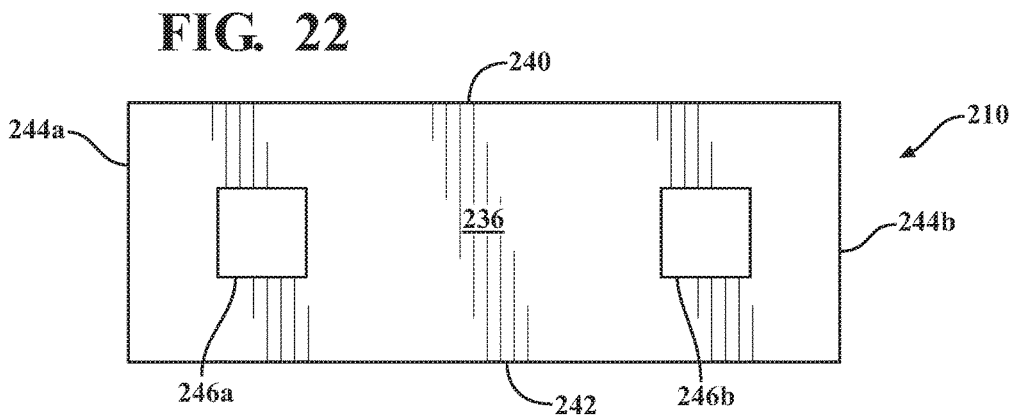


FIG. 22

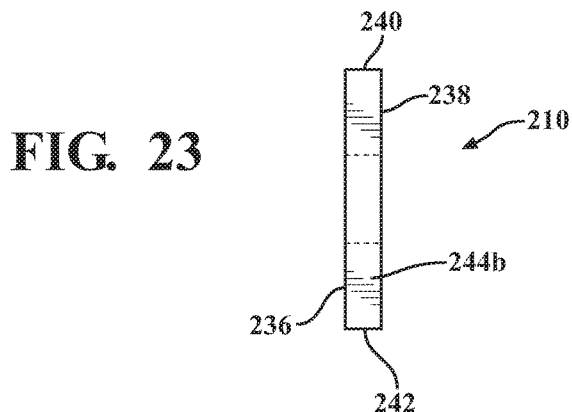


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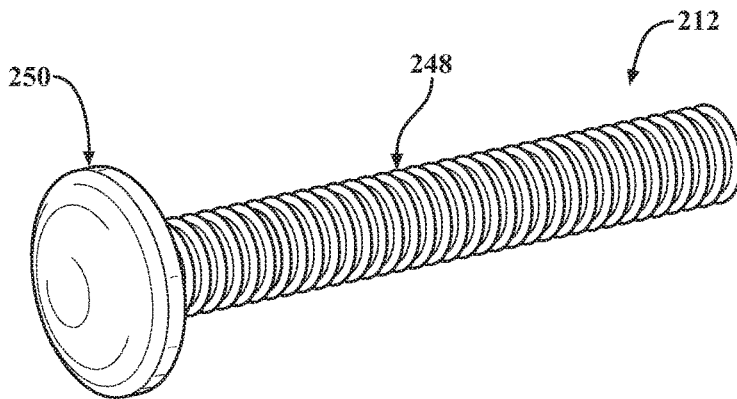


FIG. 24

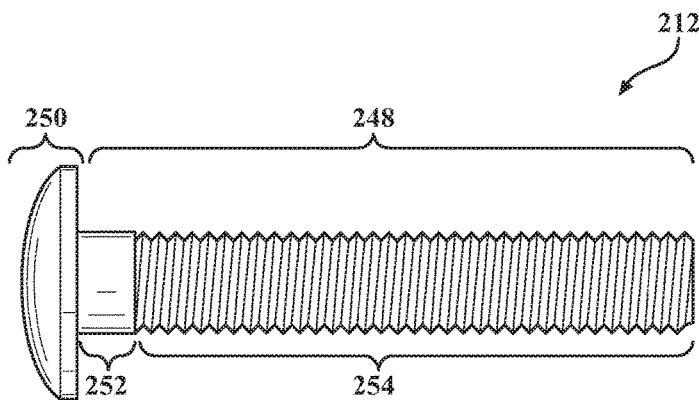


FIG. 25

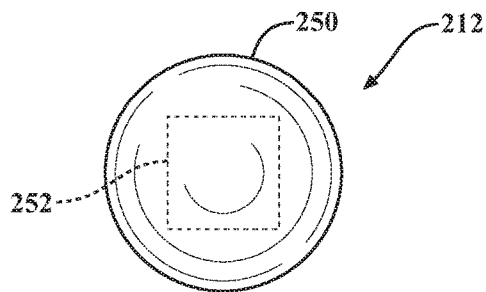


FIG. 26

FIG. 27

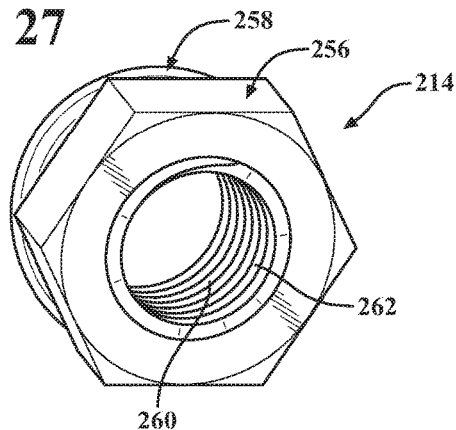


FIG. 28

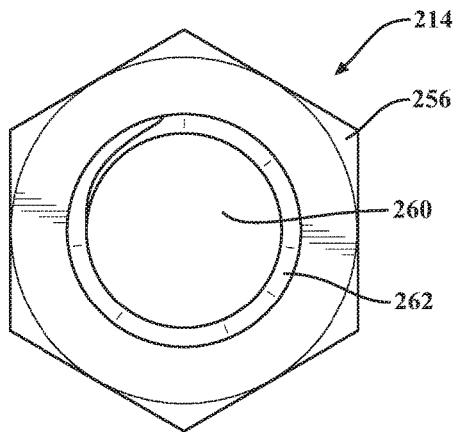


FIG. 29

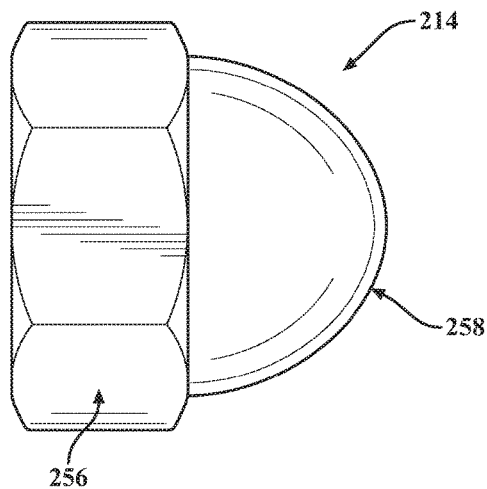


FIG. 30

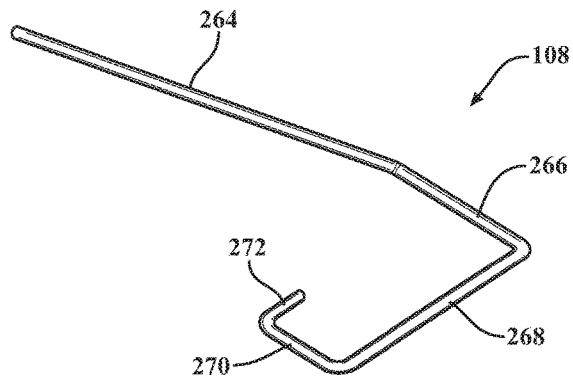


FIG. 31

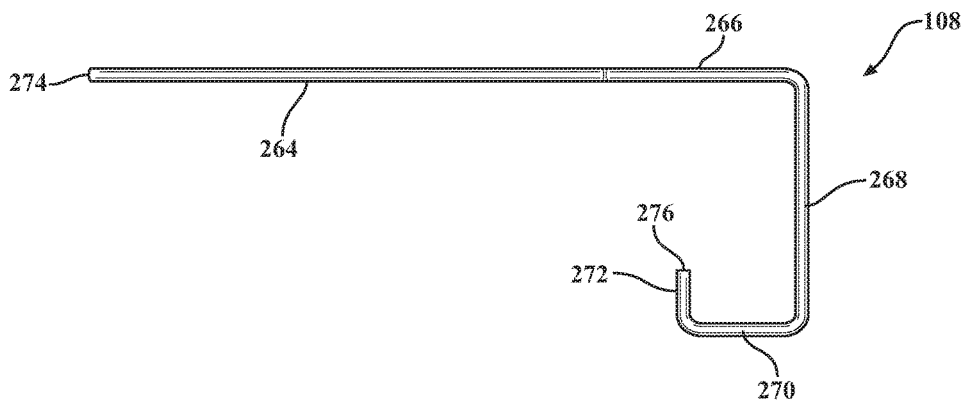
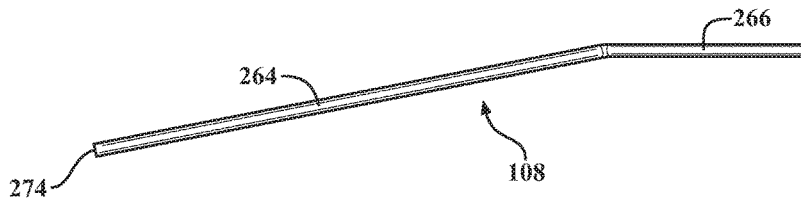


FIG. 32



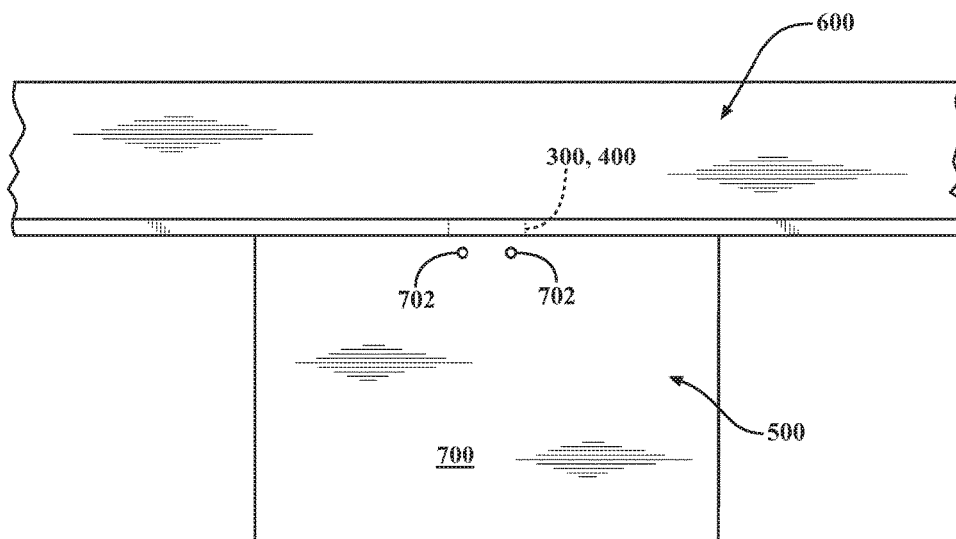


FIG. 33

FIG. 34

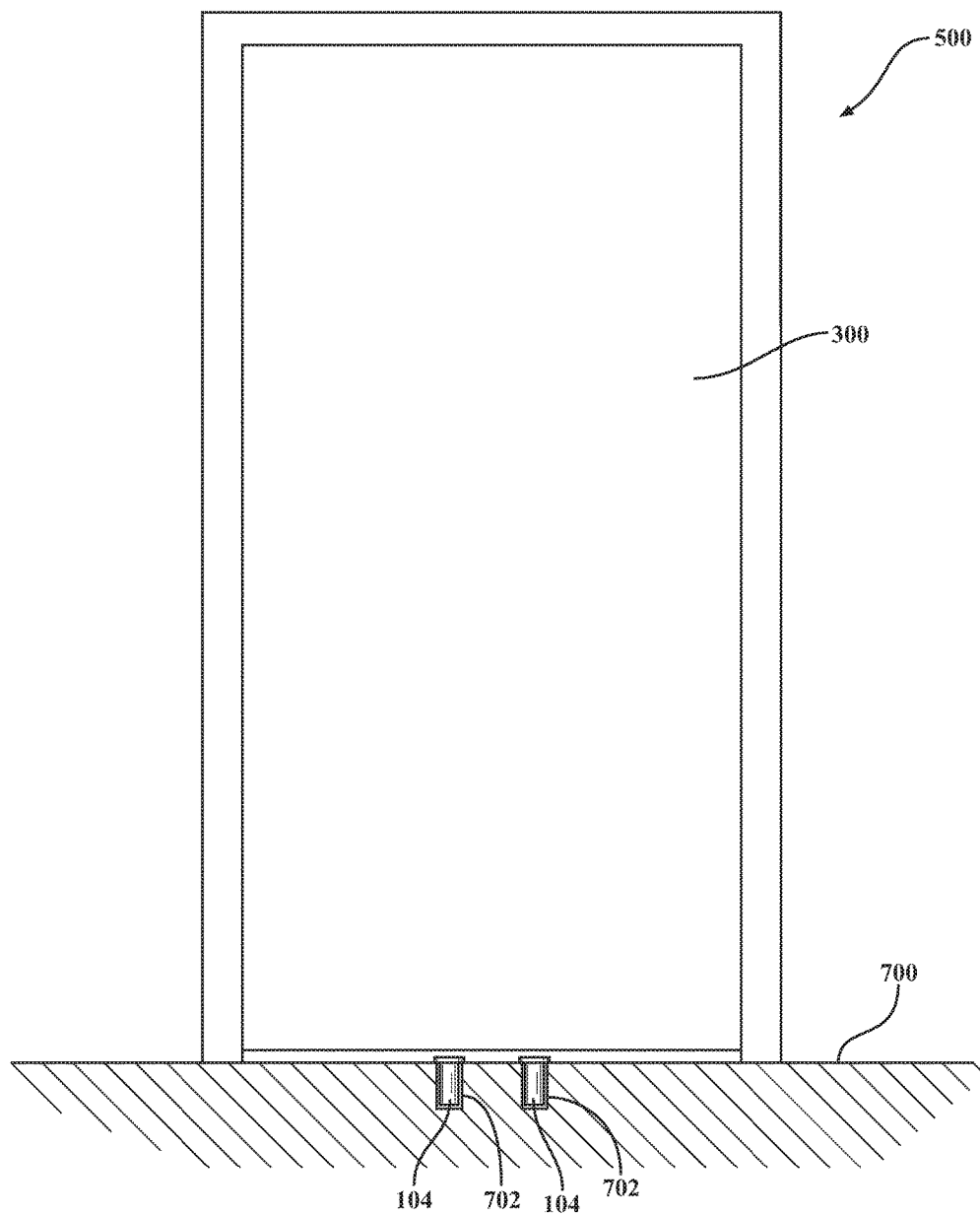
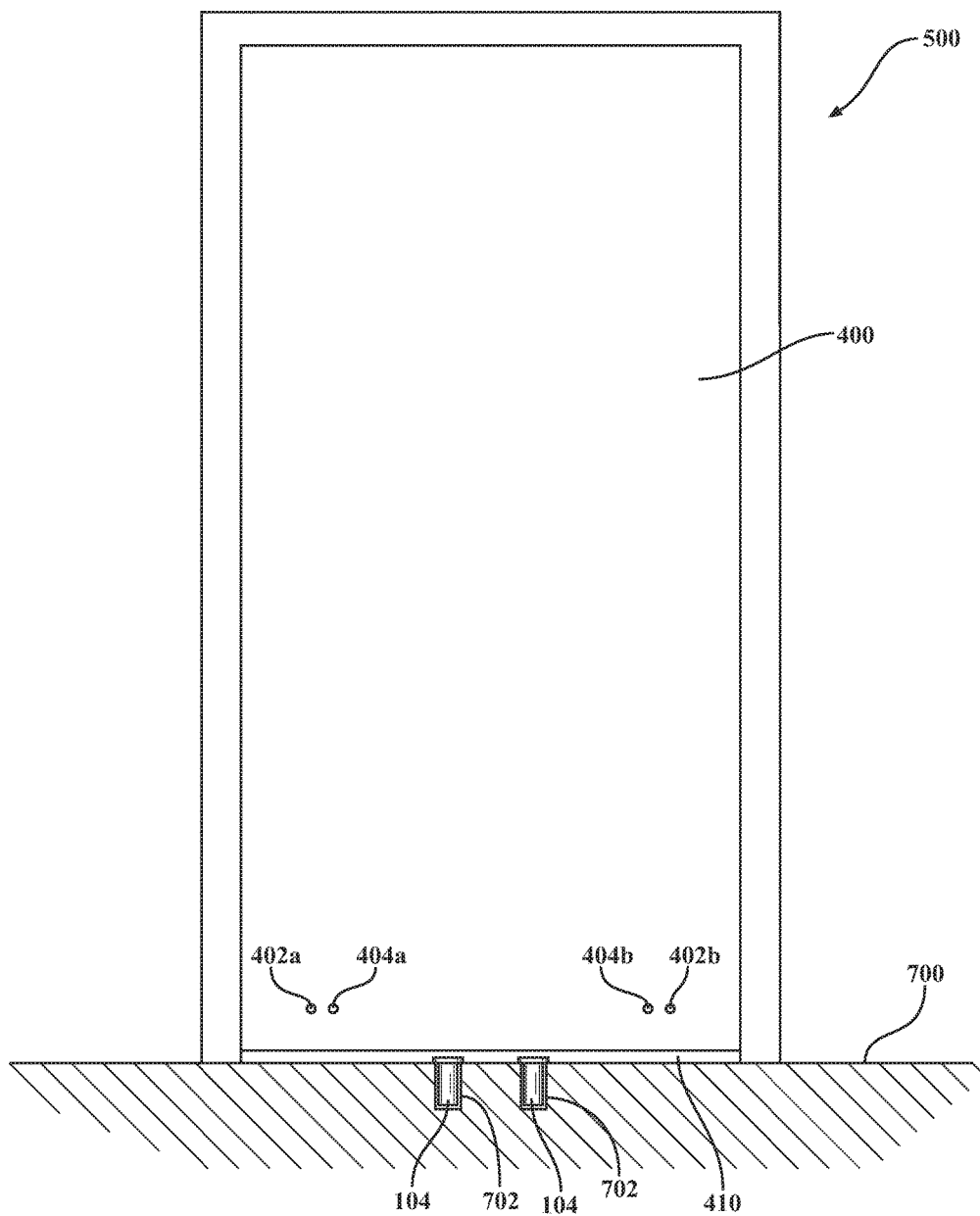


FIG. 35



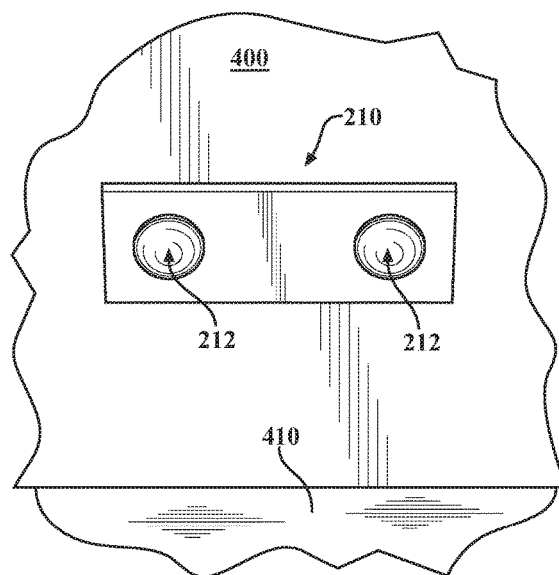
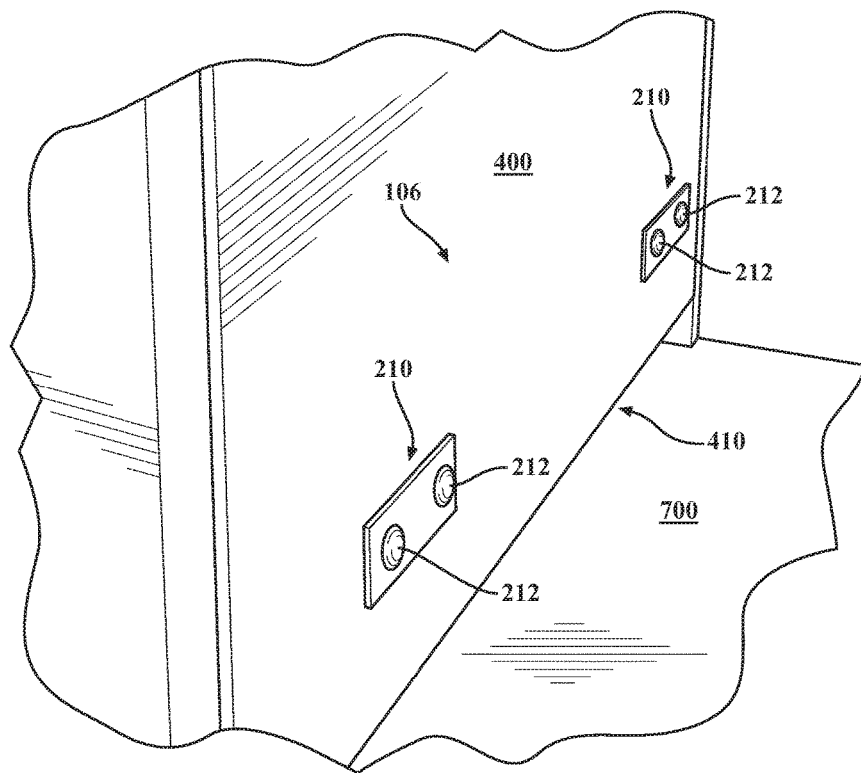


FIG. 36

FIG. 37



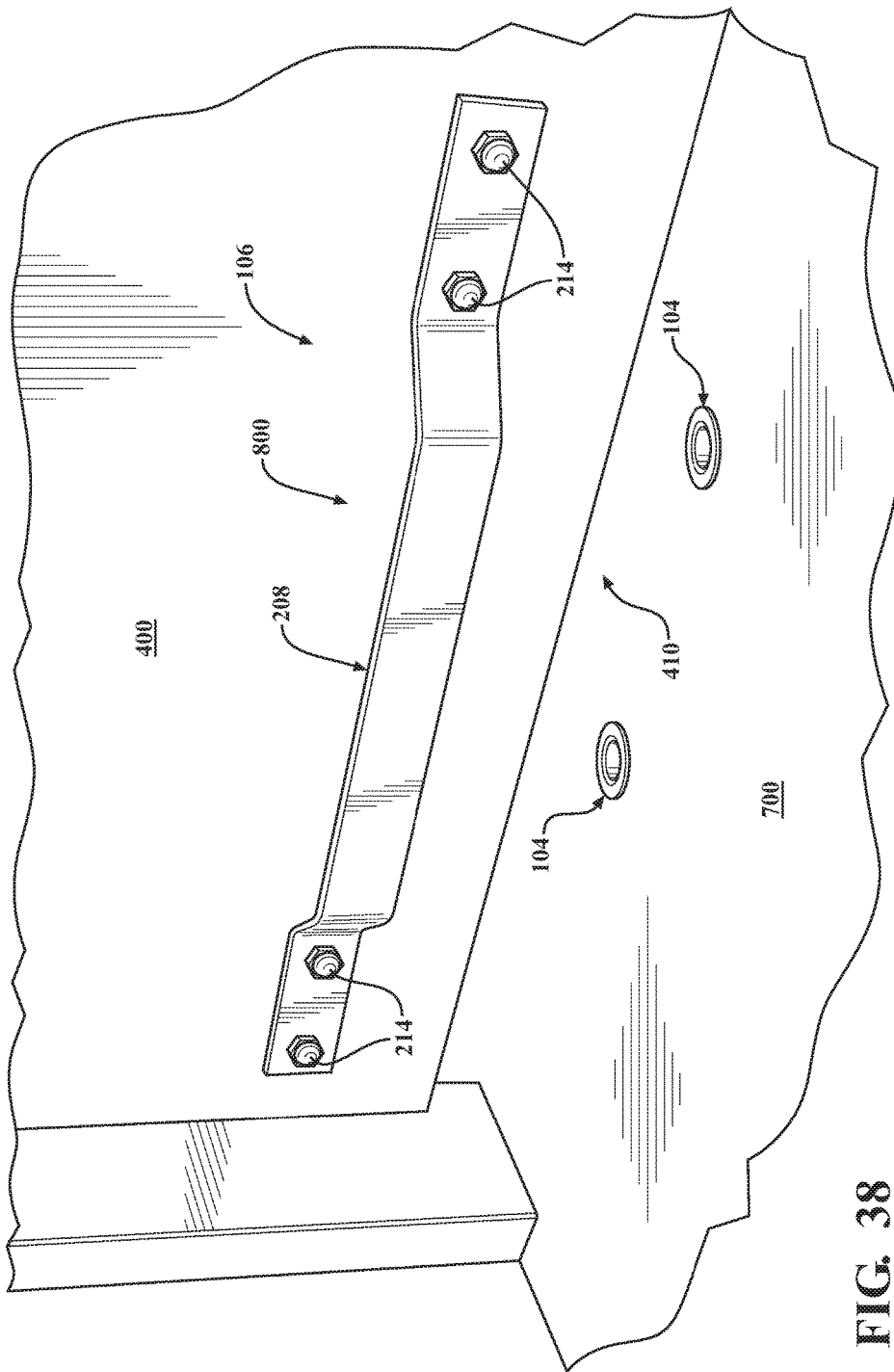


FIG. 38

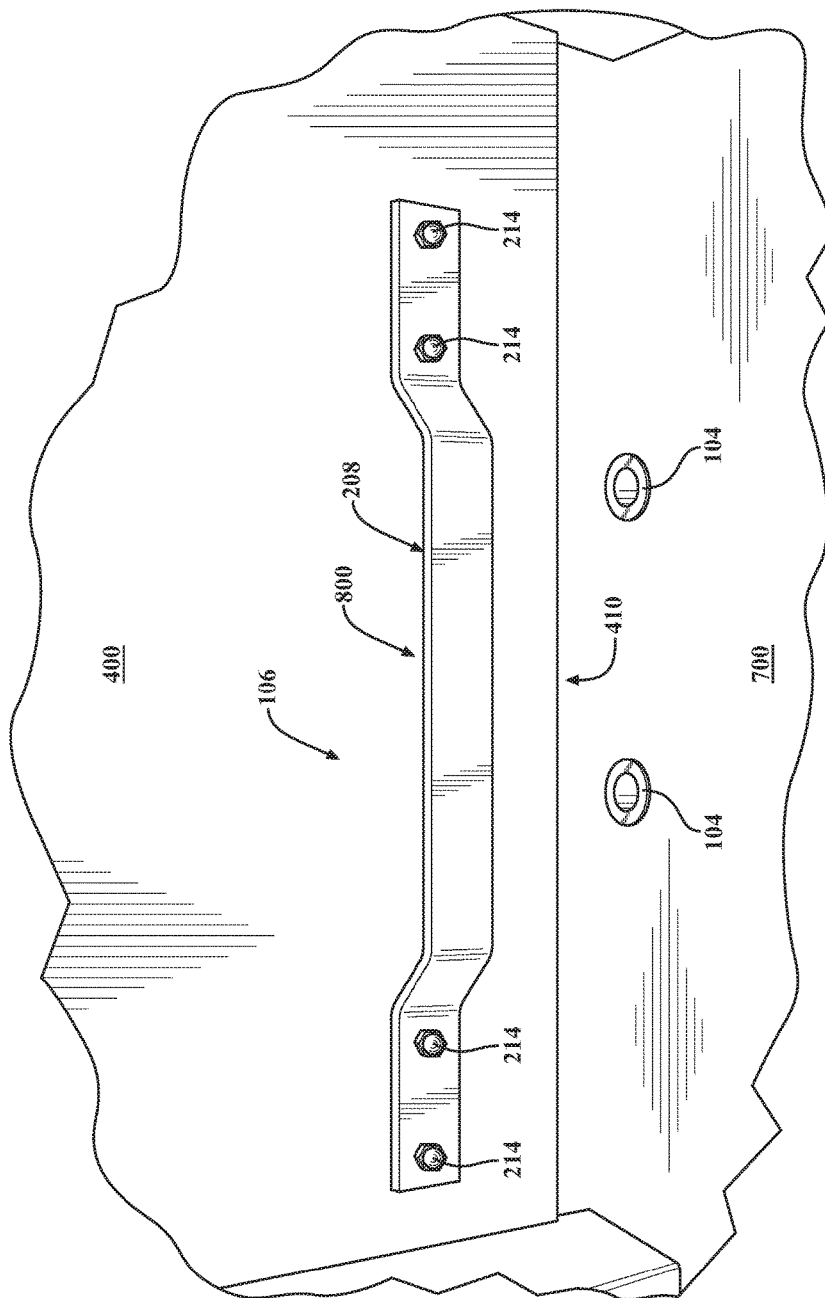


FIG. 39

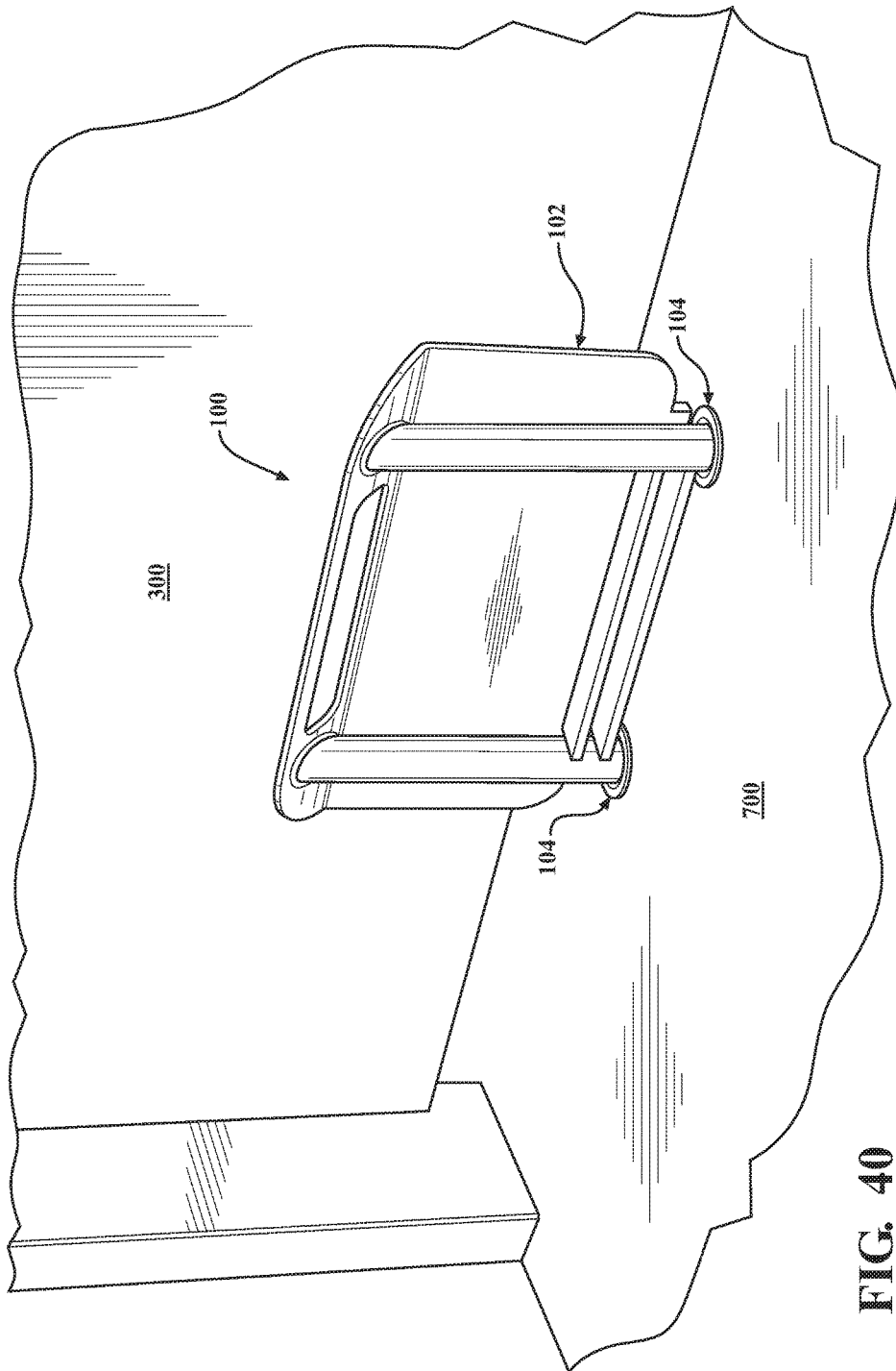


FIG. 40

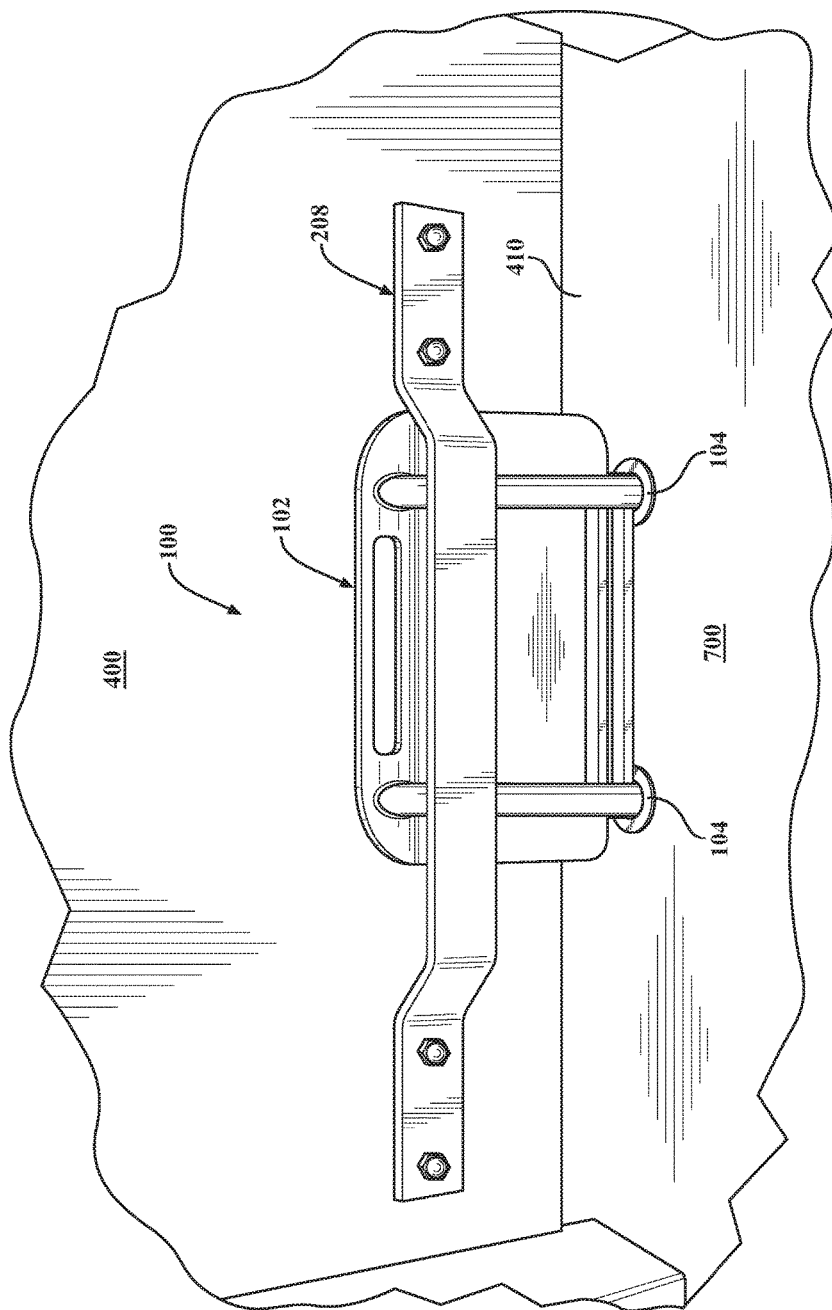


FIG. 41

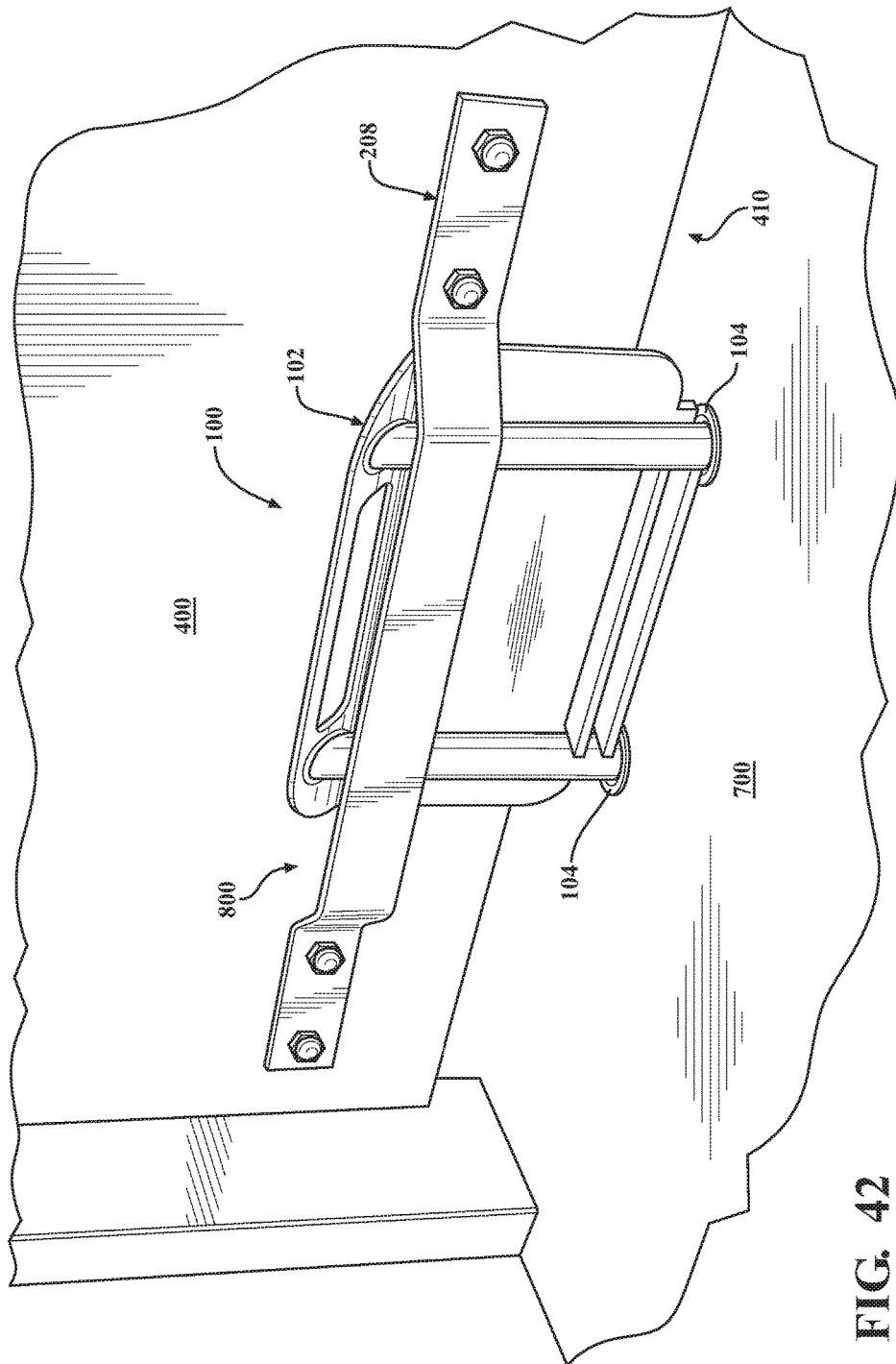


FIG. 42

FIG. 43

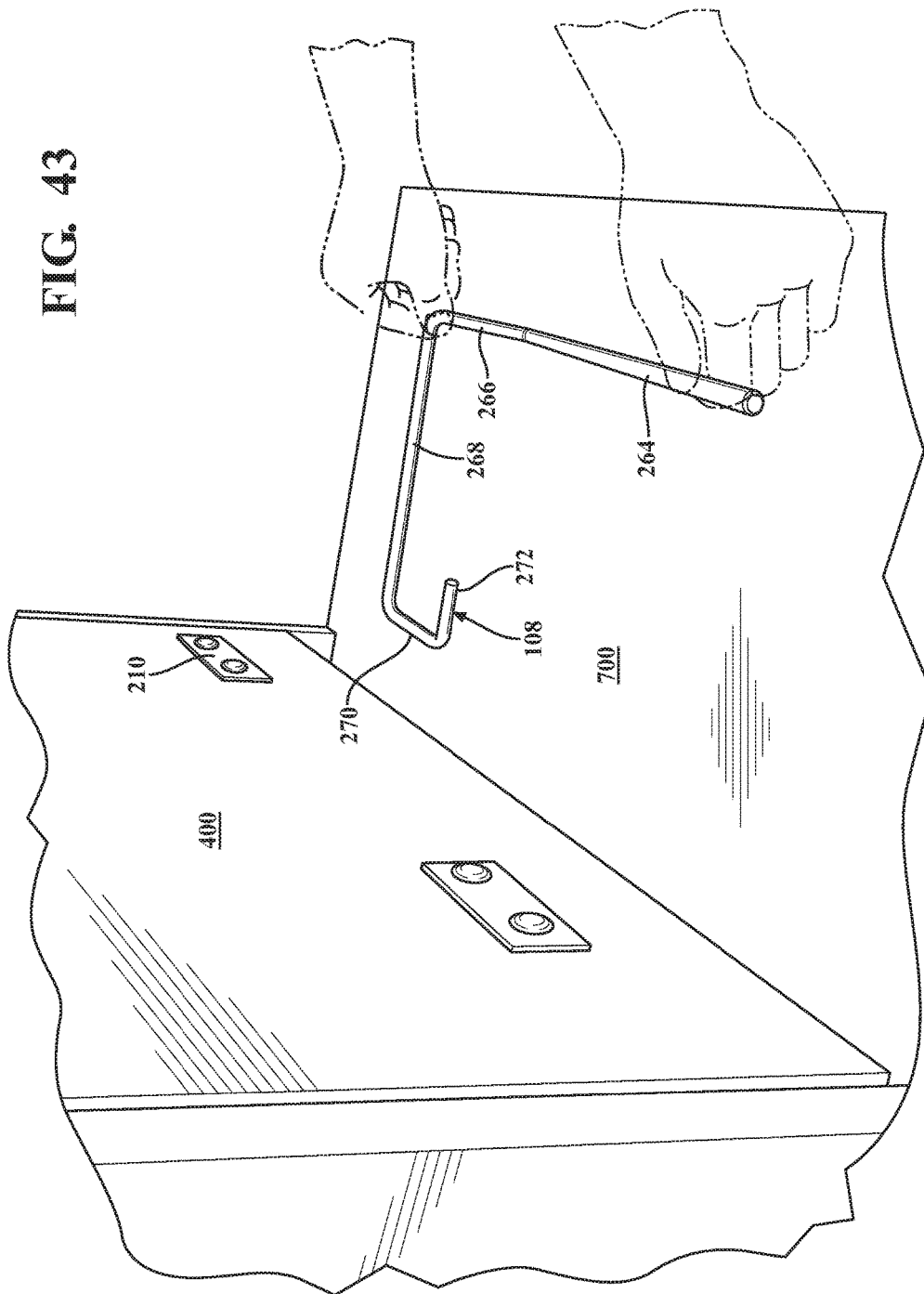
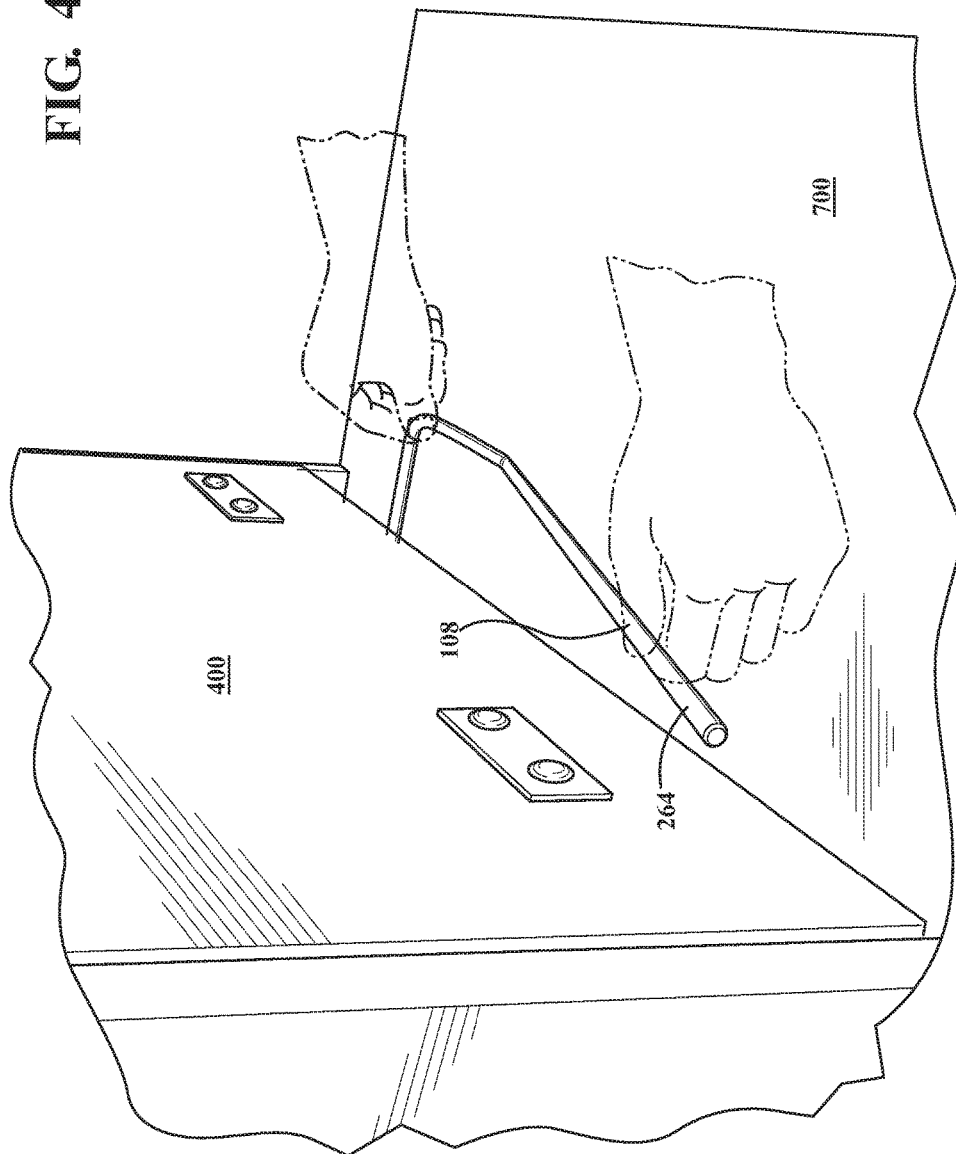


FIG. 44



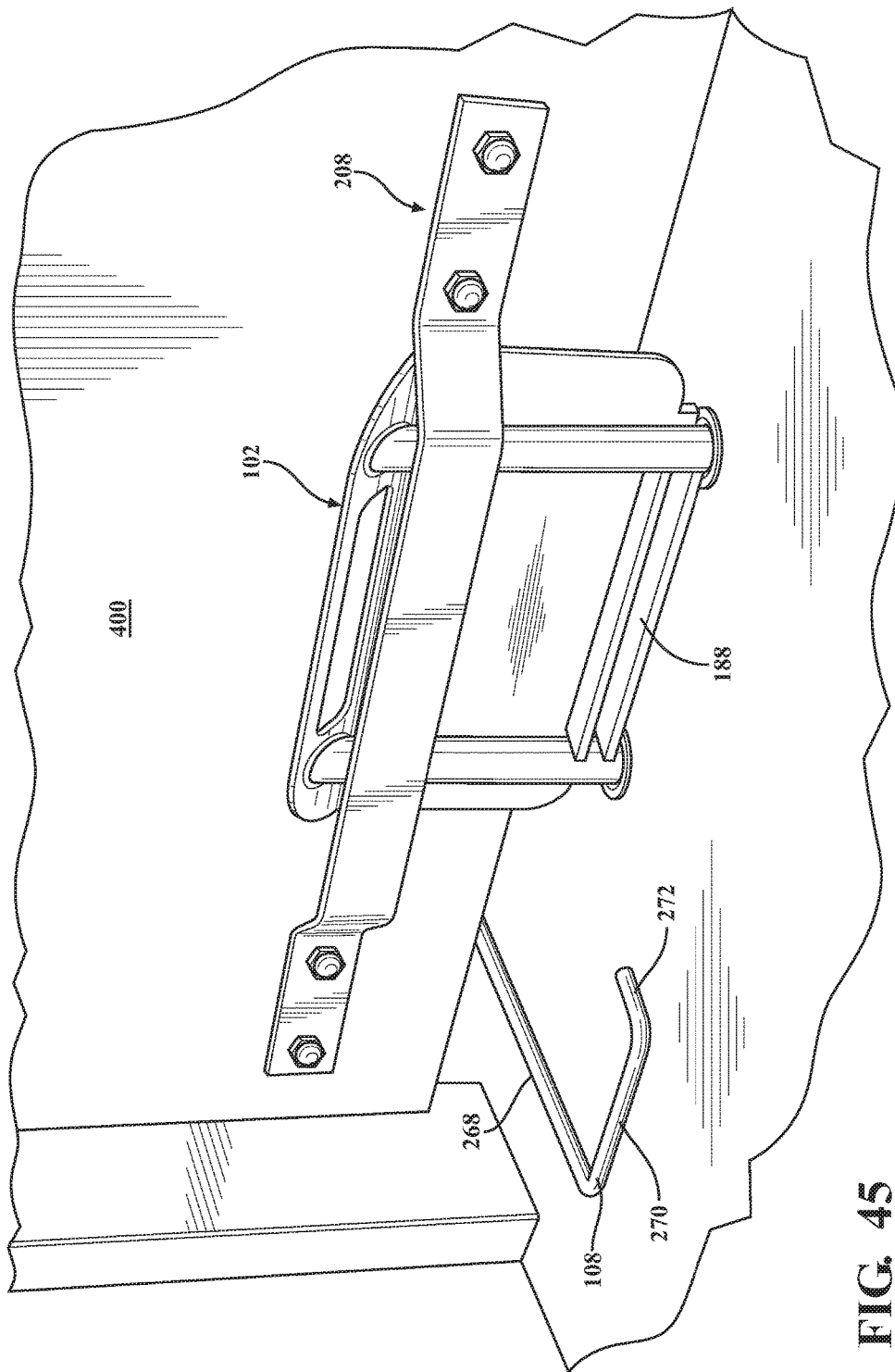
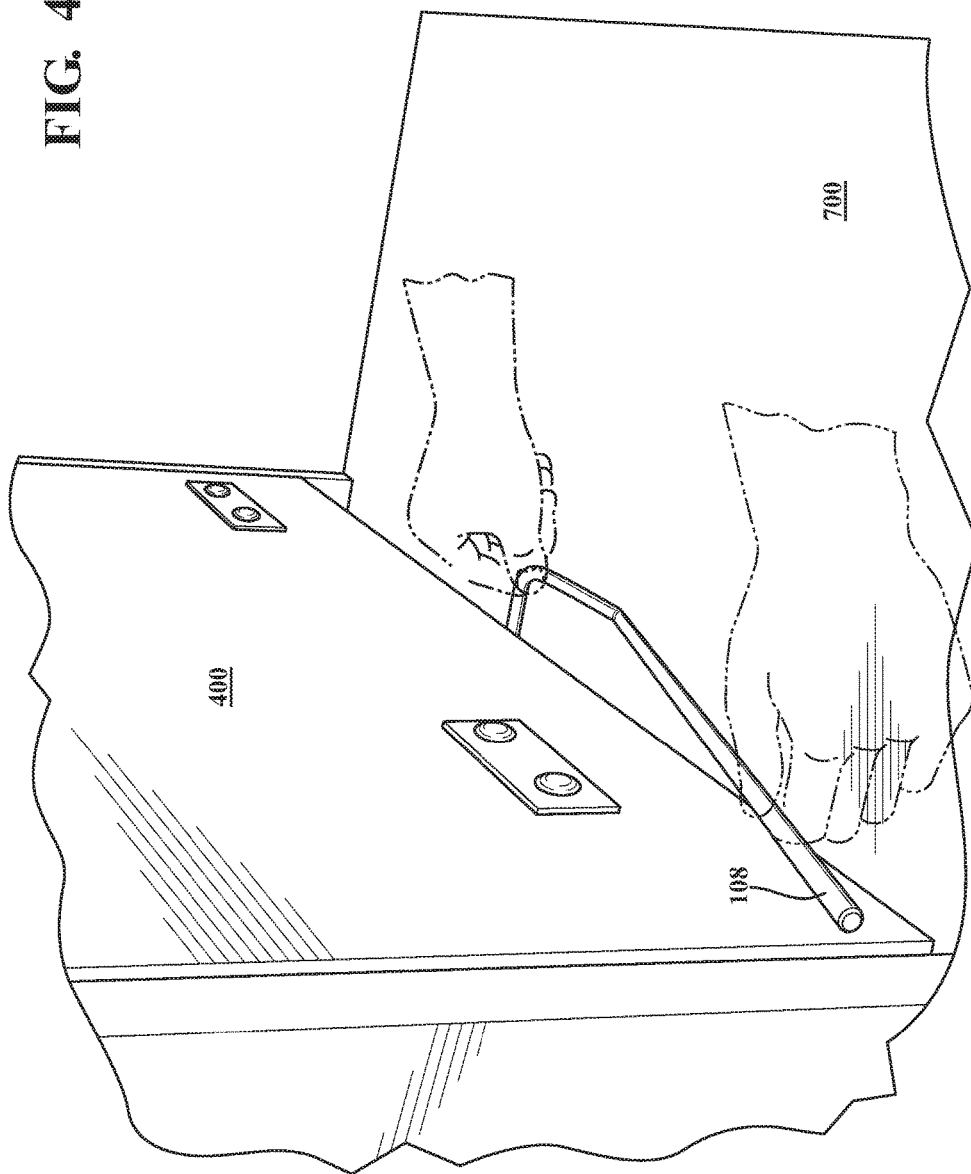


FIG. 45

FIG. 46



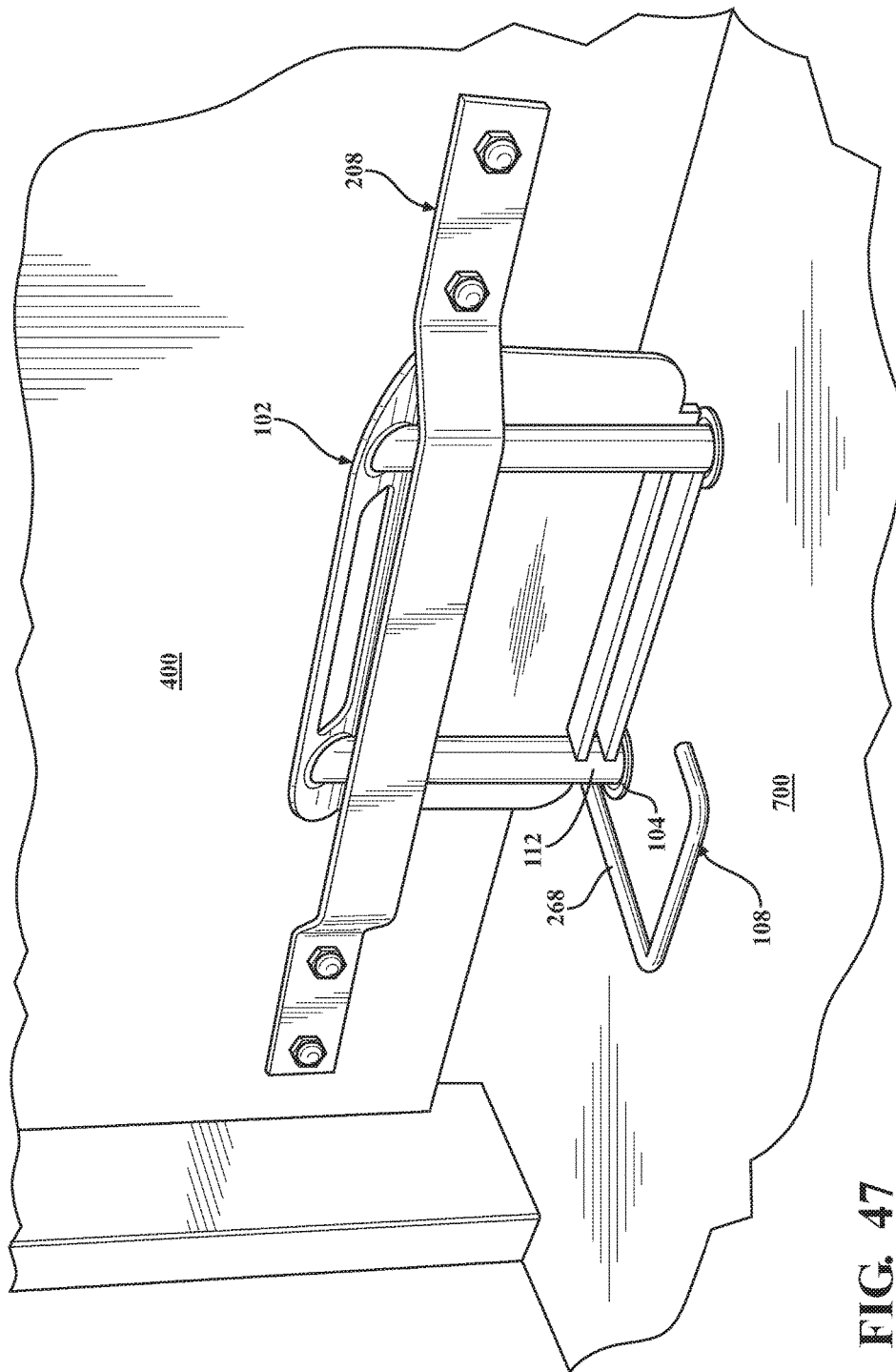
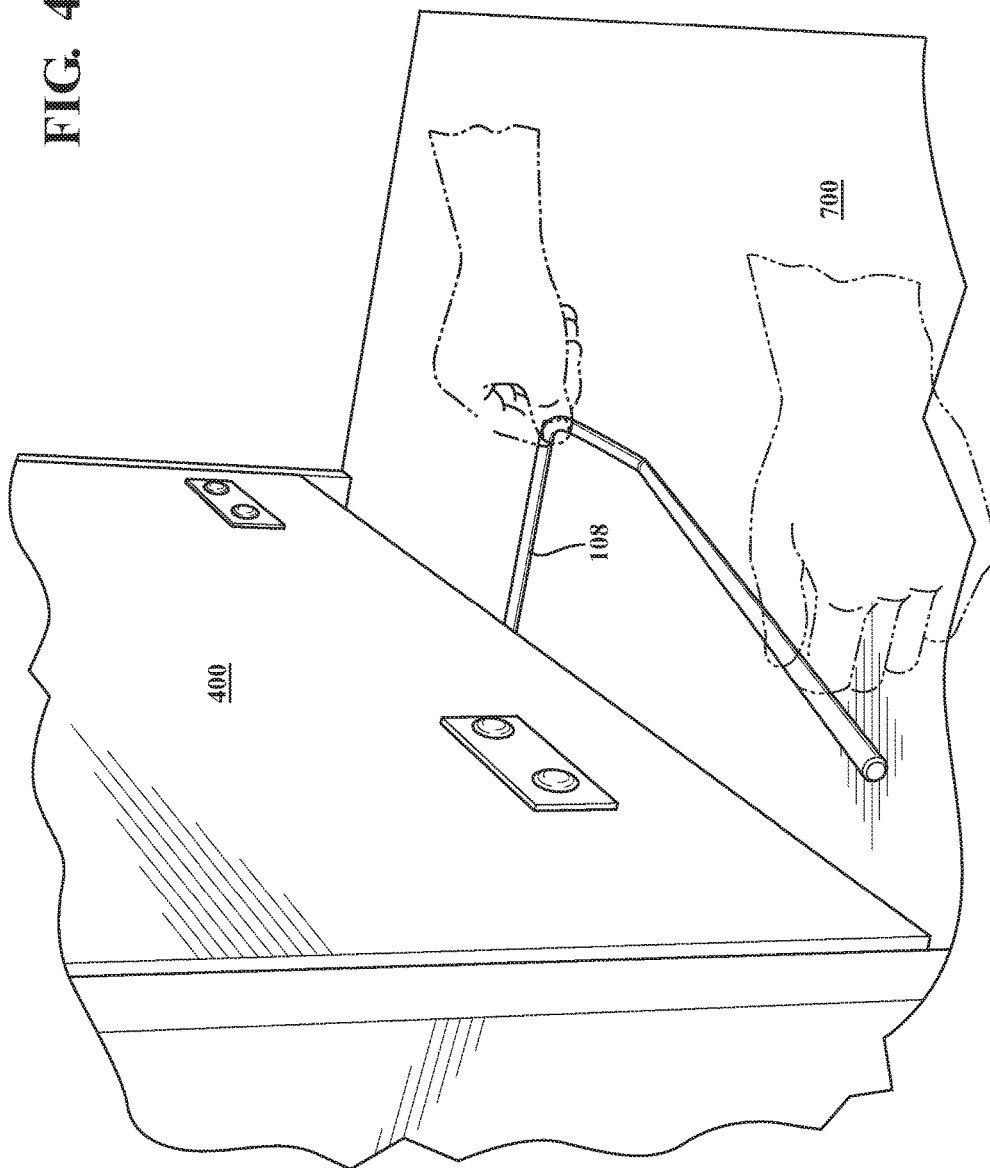


FIG. 48



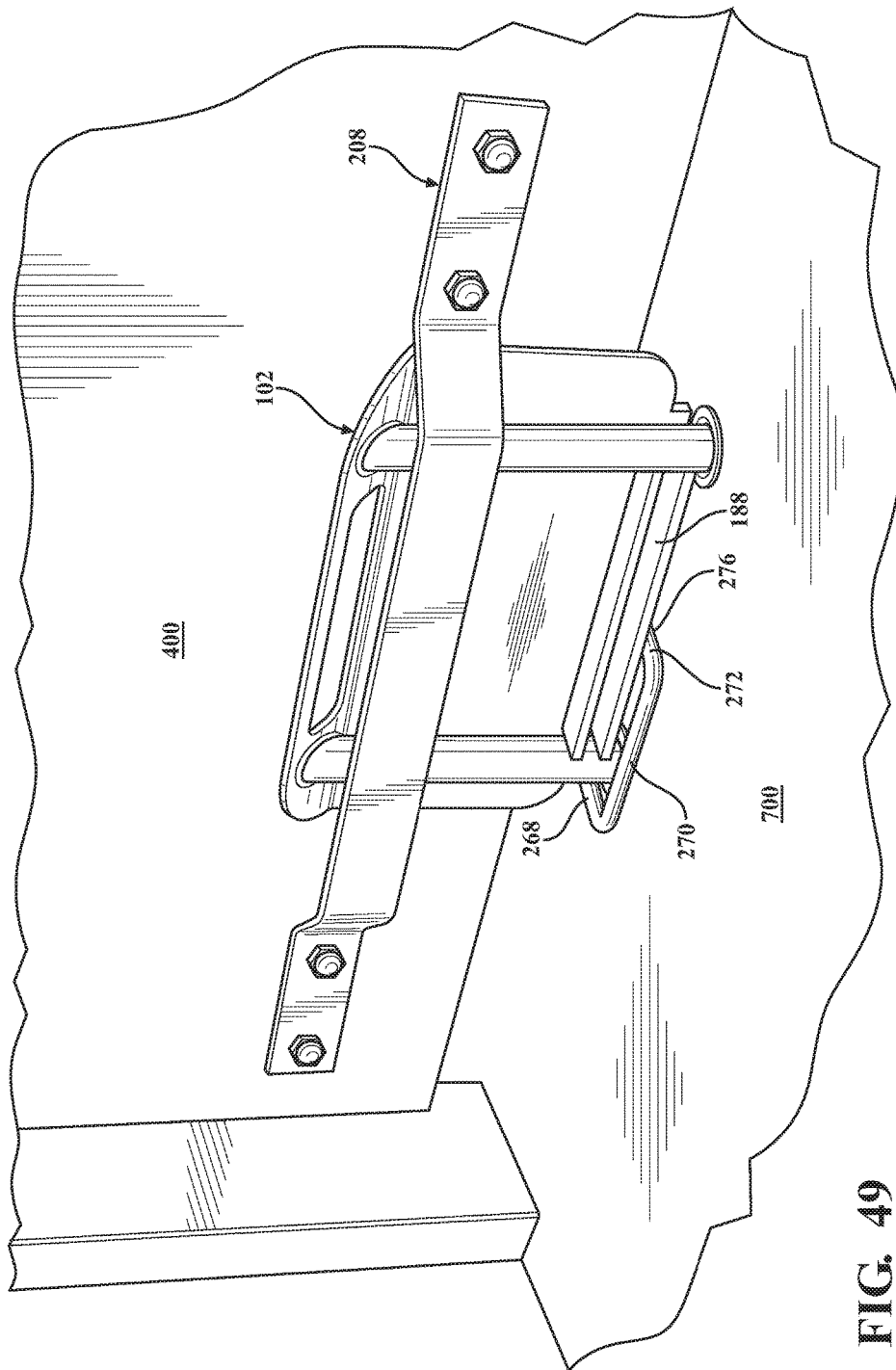
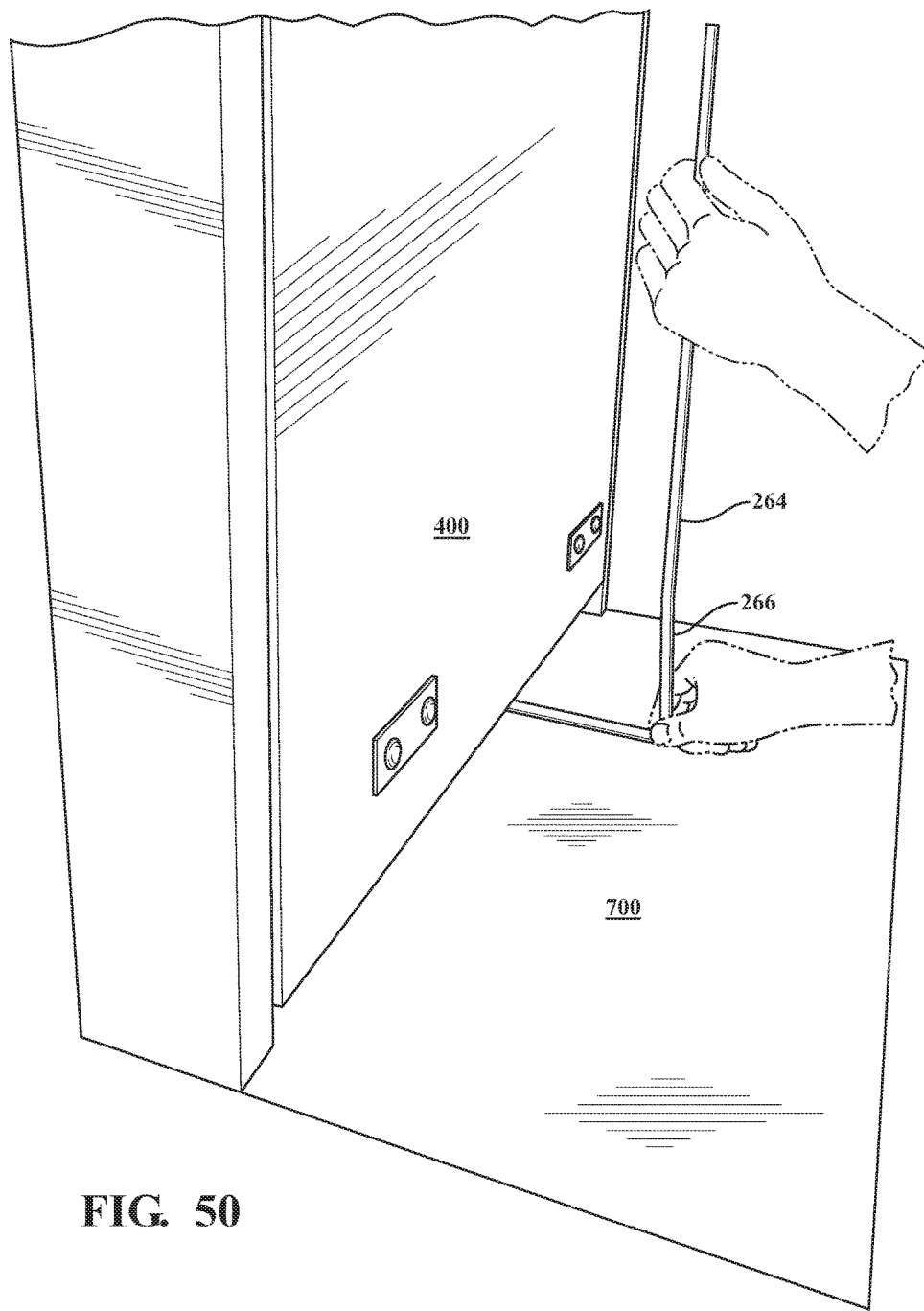


FIG. 49



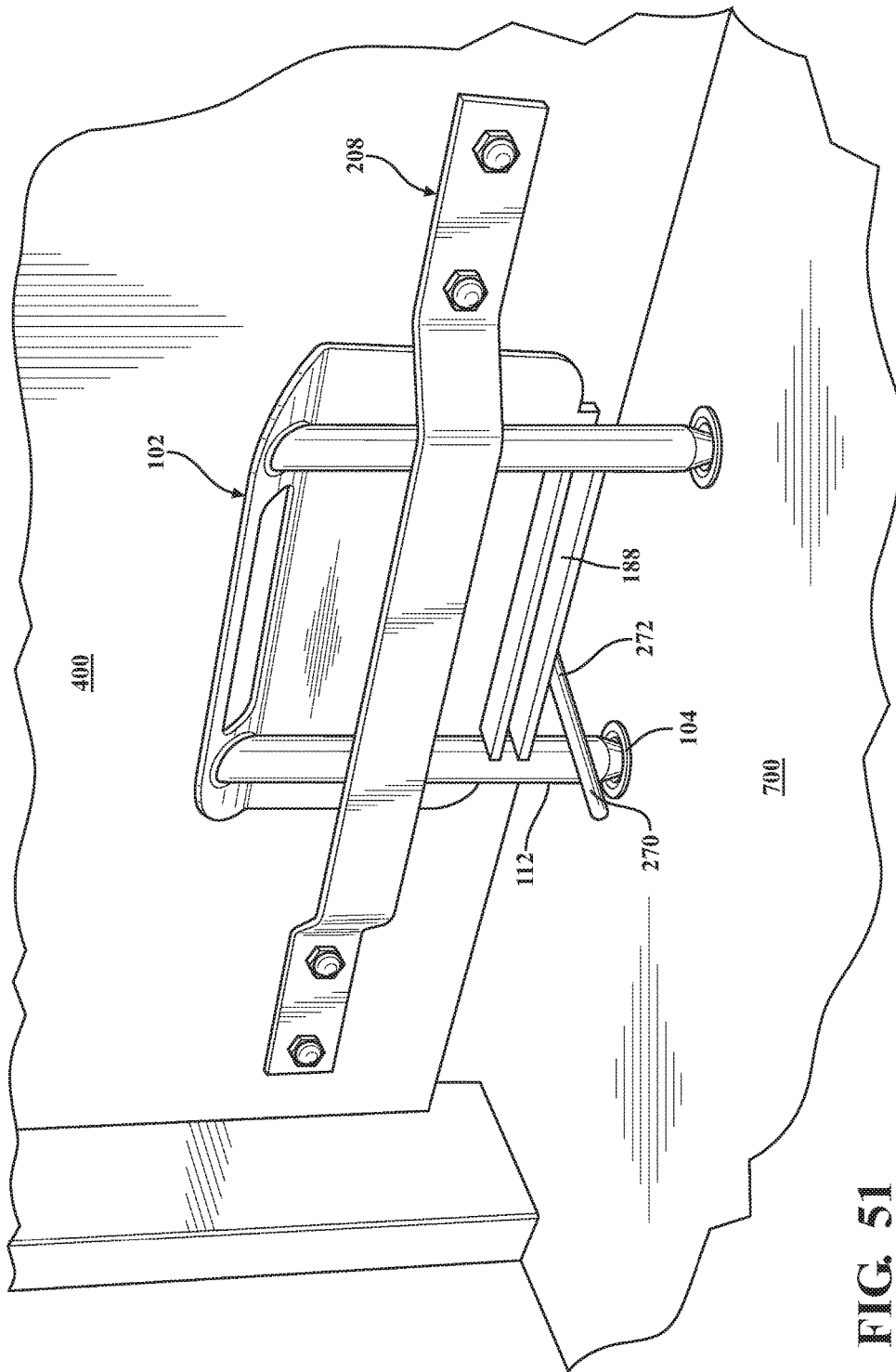


FIG. 51

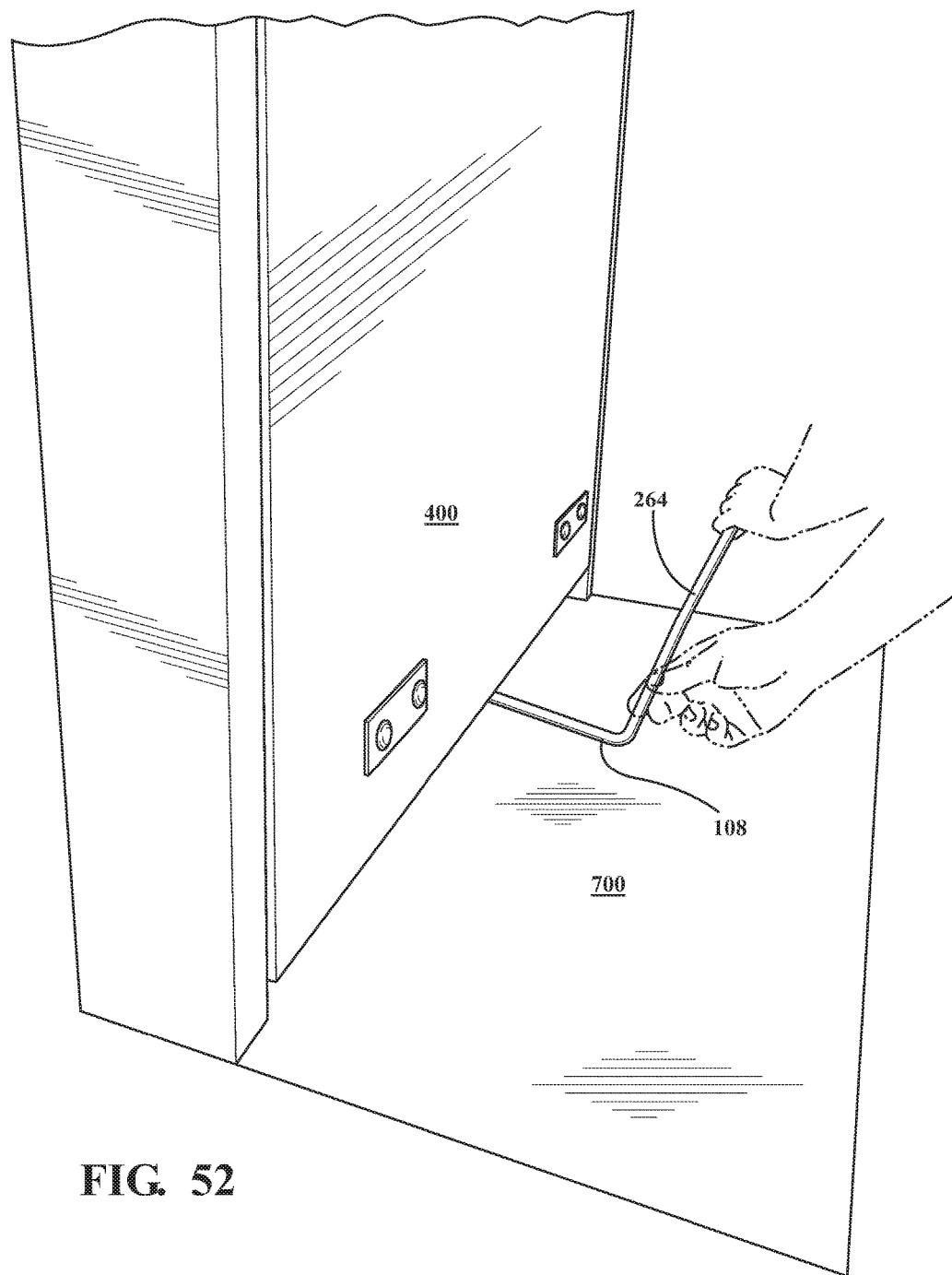


FIG. 52

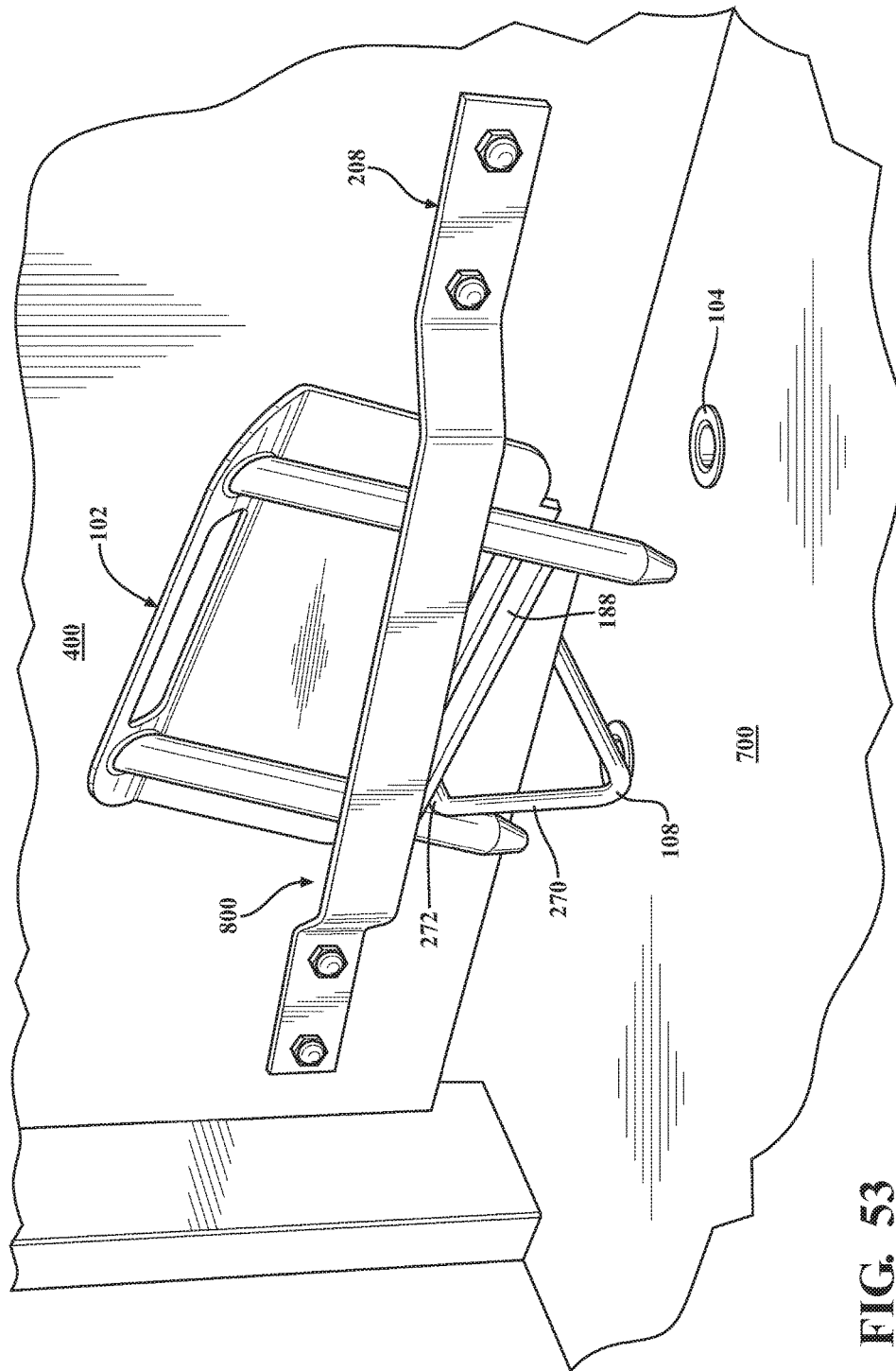


FIG. 53

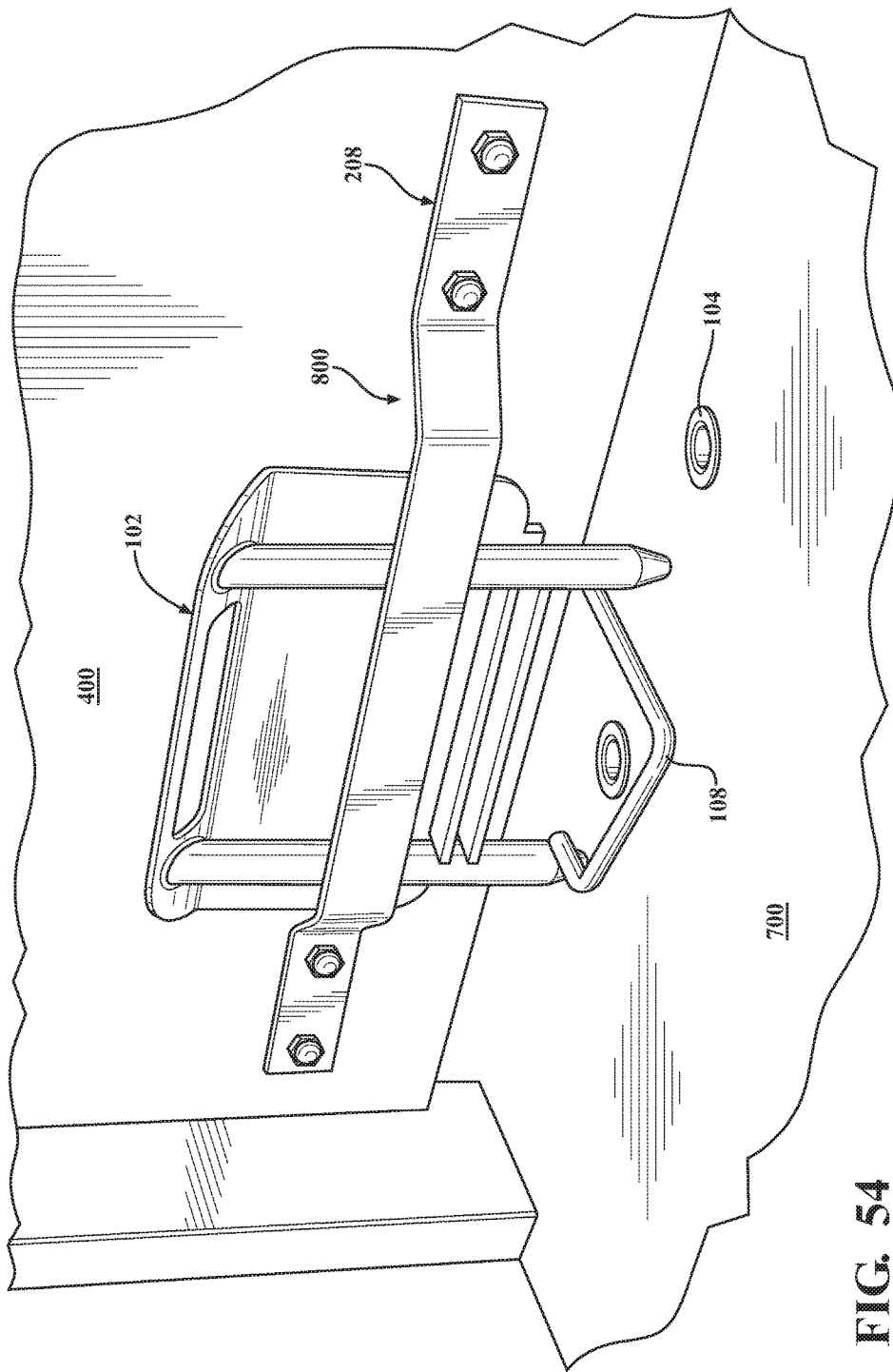


FIG. 54

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**DOOR SECURITY SYSTEM AND METHOD
OF USING SAME****CROSS-REFERENCE AND INCORPORATION
BY REFERENCE**

This patent application claims the domestic priority of U.S. Provisional Patent Application Ser. No. 61/812,410, filed Apr. 16, 2013, and entitled "Security Apparatus And Method For Doors". U.S. Provisional Patent Application Ser. No. 61/812,410 is hereby incorporated by reference in its entirety.

FIELD OF THE INVENTION

The invention relates to a security system and, more particularly, a door security system and a method of using same.

BACKGROUND OF THE INVENTION

Security for residential homes and commercial buildings, offices, storage, schools, universities, and the like, is of concern for all the owners and/or occupants of those properties and particularly in areas where high concentrations of breaking and entering or other crimes occur. The security for these types of real estate properties is riddled with various security inventions or devices. All of these various security inventions or devices are well-known in the prior art and, depending upon the criminal, provide a deterrent to an unauthorized entry and/or at least provide an obstacle to the unauthorized entry that may facilitate a sufficient amount of time for a third party to witness the crime and report it to the proper authorities before the criminal can commit further crimes related to the real estate property or occupants of the real estate property.

In many instances, it may be desirable to prevent a door from being opened so as to prevent (or at least delay) an unauthorized person from entering the room and gaining access to the people and/or items in the room. There are a number of security devices that can be installed on a door to prevent the opening of the door, including dead bolts, chain locks, alarm systems, etc. While many of these security devices may assist in at least delaying an unauthorized person from entering a room, these security devices likely will not prevent an unauthorized person from entering a room. There are further security devices that may be installed across a door frame or secured to a floor that can prevent a door from being opened into the room, but these security devices are not known to be able to operate effectively when the door is opened outwardly. Furthermore, these types of security devices are generally prohibited under most, if not all, jurisdictional fire codes because they cannot be disengaged or removed from outside of the room and, therefore, such security devices are not usable in certain environments which must comply with jurisdictional fire codes, such as schools and office buildings.

The present invention provides a door security system, and a method of using same, which seeks to overcome the disadvantages of prior art door security systems.

SUMMARY OF THE INVENTION

A first preferred embodiment of the invention provides a door security system for use in connection with a door. The door security system has a security apparatus and a release mechanism. The security apparatus has a floor engaging

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portion and a door blocking portion. The security apparatus is provided in a first space adjacent to a first side of the door. The door blocking portion is configured to block the door from opening into the first space. The floor engaging portion is configured to engage a floor provided in the first space in a manner which retains the security apparatus in place relative to the floor. The release mechanism has a handle portion and a security apparatus engaging portion. The handle portion is provided in a second space adjacent to a second side of the door. The security apparatus engaging portion is connected to the handle portion and extends into the first space via a slot provided between a bottom of the door and the floor. The handle portion is configured to be manipulated to cause the security apparatus engaging portion to engage the security apparatus in a manner which causes the floor engaging portion to disengage from the floor.

The first embodiment of the door security apparatus preferably further includes a receiving assembly. The receiving assembly is provided in the floor provided in the first space. The receiving assembly is configured to receive the floor engaging portion of the security apparatus therein, thereby allowing the floor engaging portion to engage the floor provided in the first space.

The first embodiment of the door security apparatus preferably further includes an attachment assembly. The attachment assembly is configured to be secured to the door and to provide a slot between the first side of the door and the attachment assembly. The door blocking portion of the security apparatus is configured to be positioned within the slot when the floor engaging portion of the security apparatus is engaged with the floor. The attachment assembly is configured to block the door from opening into the second space.

The first embodiment of the door security apparatus the security apparatus preferably has a handle portion. The handle portion is connected to the door blocking portion of the security apparatus.

A second preferred embodiment of the invention provides a door security apparatus. The door security apparatus includes a security apparatus having a first portion which is configured to block a door from being opened into a first space, and a second portion which is configured to engage a floor inside the first space. The first portion has a door facing surface and a first space facing surface. The second portion comprises a pair of pins which are secured to the room facing surface of the first portion and which extend below the first portion to engage the floor inside the first space, whereby, when the second portion is engaged with the floor, the security apparatus inhibits the door from opening into the first space.

The first portion of the second embodiment preferably includes a floor stop member which extends inwardly from the space facing surface, and away from the door facing surface. The floor stop member is positioned between the pair of pins.

The security apparatus of the second embodiment preferably further includes a support plate which is secured to the room facing surface and which extends inwardly from the room facing surface, and away from the door facing surface. The support plate is positioned between the pair of pins, and above the stop member such that a channel is defined between the support plate and the stop member.

The door security system of the second embodiment preferably includes a release mechanism which is configured to be manipulated from a second space which is provided on an opposite side of the door from the first space. The release

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mechanism is configured to be engaged within the channel of the security apparatus to disengage the second portion of the security apparatus from the floor.

The door security system of the second embodiment preferably includes a pair of sleeves which each have an aperture provided therethrough. Each sleeve is configured to be positioned within a corresponding hole formed in the floor of the first space. Each sleeve is configured to receive a portion of one of the pins therein, thereby engaging the pins with the floor.

The security apparatus of the second embodiment preferably further includes a third portion which is secured to the first portion. The third portion has an aperture provided therethrough such that the third portion is configured to act as a handle portion of the security apparatus. Each pin is secured to the third portion and the aperture is provided between the pins.

The door security system of the second embodiment preferably further includes an attachment assembly which is configured to be secured to the door and to provide a slot between the door and the attachment assembly. The first portion of the security apparatus is configured to be positioned within the slot when the second portion of the security apparatus is engaged with the floor, thereby preventing the door from opening into the second space.

The security apparatus of the second embodiment preferably further includes a third portion which is secured to the first portion. The third portion has an aperture provided therethrough such that the third portion is configured to act as a handle portion of the security apparatus. The third portion extends from a top of the first portion in an upward and inward manner from the room facing surface, and away from the door facing surface.

A third preferred embodiment of the invention provides a method of using a door security system. The method includes the steps of: providing a door which separates a first space from a second space; providing a floor in the first and second spaces, the door being positioned over the floor, the door being separated from the floor to define a gap between the door and the floor; providing a security apparatus having a floor engaging portion and a door blocking portion, the security apparatus being provided in the first space adjacent to a first side of the door; providing a mechanism having a handle portion and a security apparatus engaging portion, the security apparatus engaging portion being connected to the handle portion, the mechanism being provided in the second space; engaging the floor engaging portion of the security apparatus with the floor provided, in the first space, thereby retaining the security apparatus in place relative to the floor, and thereby causing the door blocking portion to block the door from opening into the first space; moving the security engaging portion of the mechanism through the gap to provide that at least a portion of the security apparatus engaging portion of the mechanism is positioned in the second space; and manipulating the handle portion of the mechanism to cause the security apparatus engaging portion of the release mechanism to engage the security apparatus in a manner which causes the floor engaging portion to disengage from the floor in the first space.

The method of the third embodiment further preferably includes the steps of: providing a receiving assembly in the floor provided in the first space; and engaging the floor engaging portion of the security apparatus with the receiving assembly, thereby retaining the security apparatus in place relative to the floor, and thereby causing the door blocking portion to block the door from opening into the first space.

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The method of the third embodiment further preferably includes the steps of: providing an attachment assembly; securing the attachment assembly to the door to provide a slot between the first side of the door and the attachment assembly; and positioning the security apparatus within the slot, thereby causing the security apparatus and the attachment assembly to block the door from opening into the second space.

A fourth embodiment of the invention provides a method of using a door security system. The method includes the steps of: providing a door which separates a first space from a second space; providing a floor in the first and second spaces, the door being positioned over the floor, the floor having a pair of holes therein in the first space; providing a security apparatus of the door security system in the first space, the security apparatus comprising first and second portions, the first portion having first and second opposite surfaces, the second portion has a pair of pins which are secured to the second surface of the first portion and which extend below the first portion; positioning the first surface of the first portion of the security apparatus to face the door; positioning the pair of pins of the security apparatus over the pair of holes provided in the floor of the first space; and lowering the pair of pins of the security apparatus into the pair of holes provided in the floor of the first space, thereby engaging the security apparatus with the floor, and thereby allowing for the first portion of the security apparatus to block the door from opening into the first space.

The method of the fourth embodiment further preferably includes the steps of: providing the first portion with a floor stop member which extends inwardly from the second surface of the first portion, and away from the, first surface of the first portion, the floor stop member being positioned between the pair of pins; and lowering the pair of pins of the security apparatus into the pair of holes provided in the floor of the first space until the floor stop member is prevented from further downward movement relative to the floor of the first space.

The method of the fourth embodiment further preferably includes the steps of: providing the security apparatus with a support plate which is secured to the first surface of the first portion and which extends inwardly from the first surface of the first portion, the support plate being positioned between the pair of pins, the support plate being positioned above the stop member such that a channel is defined between the support plate and the stop member; providing a gap between a bottom of the door and the floor; providing a release mechanism having a handle portion and a security apparatus engaging portion; manipulating the release mechanism from the second space to position the handle portion in the second space and the security apparatus engaging portion in the first space, with the release mechanism spanning the gap between the bottom of the door and the floor; manipulating the handle portion of the release mechanism to cause the security apparatus engaging portion to be positioned within the channel of the security apparatus; and manipulating the handle portion of the release mechanism to cause the security apparatus engaging portion to engage the security apparatus within the channel to disengage the pins of the security apparatus from the floor in the first space.

The method of the fourth embodiment further preferably includes the steps of: providing a pair of sleeves which each have an aperture provided therethrough; positioning the pair of sleeves into the pair of holes provided in the floor of the first space; and lowering the pair of pins of the security apparatus into the apertures of the pair of sleeves, thereby

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engaging the security apparatus with the floor, and thereby allowing for the first portion of the security apparatus to block the door from opening into the first space.

The method of the fourth embodiment preferably further includes the steps of: providing an attachment assembly; securing the attachment assembly to the door to provide a slot between the door and the attachment assembly, the slot being provided in the first space and being positioned above the pair of holes in the floor in the first space; positioning the security apparatus over the slot; positioning the first surface of the first portion of the security apparatus to face the door; positioning the pair of pins of the security apparatus over the pair of holes provided in the floor of the first space; and lowering the pair of pins of the security apparatus through the slot and into the pair of holes provided in the floor of the first space, thereby engaging the security apparatus with the floor, securing the security apparatus within the slot, allowing for the first portion of the security apparatus to block the door from opening into the first space, and allowing for the attachment assembly and the security apparatus to block the door from opening into the second space.

BRIEF DESCRIPTION OF THE DRAWINGS

For a more complete understanding of the disclosure, reference may be made to the following detailed description and accompanying drawings wherein like reference numerals identify like elements in which:

FIG. 1 is a perspective view of a main plate of a security apparatus forming part of a door security system of a preferred embodiment of the invention;

FIG. 2 is a top view of the main plate illustrated in FIG. 1;

FIG. 3 is a front view of the main plate illustrated in FIG. 1;

FIG. 4 is a side view of the main plate illustrated in FIG. 1;

FIG. 5 is a perspective view of a pin of the security apparatus forming part of the door security system of the preferred embodiment of the invention;

FIG. 6 is a side view of the pin illustrated in FIG. 5;

FIG. 7 is a bottom view of the pin illustrated in FIG. 5;

FIG. 8 is a perspective view of a support plate of the security apparatus forming part of the door security system of the preferred embodiment of the invention;

FIG. 9 is a top view of the support plate illustrated in FIG. 8;

FIG. 10 is a side view of the support plate illustrated in FIG. 8;

FIG. 11 is a perspective view of the security apparatus forming part of the door security system of the preferred embodiment of the invention;

FIG. 12 is a top view of the security apparatus illustrated in FIG. 11;

FIG. 13 is a front view of the security apparatus illustrated in FIG. 11;

FIG. 14 is a side view of the security apparatus illustrated in FIG. 11;

FIG. 15 is a perspective view of a sleeve forming part of the door security system of the preferred embodiment of the invention;

FIG. 16 is a bottom view of the sleeve illustrated in FIG. 15;

FIG. 17 is a front view of the sleeve illustrated in FIG. 15;

FIG. 18 is a perspective view of a strap plate of an attachment assembly forming part of the door security system of the preferred embodiment of the invention;

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FIG. 19 is a front view of the strap plate illustrated in FIG. 18;

FIG. 20 is a bottom view of the strap plate illustrated in FIG. 18;

FIG. 21 is a perspective view of a washer plate of the attachment assembly forming part of the door security system of the preferred embodiment of the invention;

FIG. 22 is a rear view of the washer plate illustrated in FIG. 21;

FIG. 23 is a side view of the washer plate illustrated in FIG. 21;

FIG. 24 is a perspective view of a bolt of the attachment assembly forming part of the door security system of the preferred embodiment of the invention;

FIG. 25 is a side view of the bolt illustrated in FIG. 24;

FIG. 26 is a top view of the bolt illustrated in FIG. 24;

FIG. 27 is a perspective view of a nut of the attachment assembly forming part of the door security system of the preferred embodiment of the invention;

FIG. 28 is a bottom view of the nut illustrated in FIG. 27;

FIG. 29 is a side view of the nut illustrated in FIG. 27;

FIG. 30 is a perspective view of a release mechanism forming part of the door security system of the preferred embodiment of the invention;

FIG. 31 is a top view of the release mechanism illustrated in FIG. 30;

FIG. 32 is a side view of the release mechanism illustrated in FIG. 30;

FIGS. 33-39 illustrate the initial installation of the door security system of the preferred embodiment of the invention;

FIG. 40 illustrates the installation and operation of the door security system of the preferred embodiment of the invention in connection with an inwardly opening door; and

FIGS. 41-54 illustrate the installation and operation of the door security system of the preferred embodiment of the invention in connection with an outwardly opening door.

DETAILED DESCRIPTION OF THE ILLUSTRATED EMBODIMENTS

While the present disclosure is susceptible to various modifications and alternative forms, certain embodiments are shown by way of example in the drawings and these embodiments will be described in detail herein. It will be understood, however, that this disclosure is not intended to limit the invention to the particular form described, but to the contrary, the invention is intended to cover all modifications, alternatives, and equivalents falling within the spirit and scope of the invention defined by the appended claims.

A door security system **100** is provided which includes a security apparatus **102**, a pair of sleeves **104**, an attachment assembly **106**, and a release mechanism **108**.

The security apparatus **102** is best illustrated in FIGS. 1-14. The security apparatus **102** includes a main plate **110**, a pair of pins **112**, and a support plate **114**.

As best illustrated in FIGS. 1-4, the main plate **110** includes a middle portion **116** having a front surface **118** and a rear surface **120**. The middle portion **116** has a top edge **122**, a bottom edge **124**, and a pair of side edges **126a**, **126b** which connect the top edge **122** to the bottom edge **124**. The bottom edge **124** has a length which is preferably less than a length of the top edge **122**. Each side edge **126a**, **126b** preferably has a first side edge portion **128a**, **128b**, a second side edge portion **130a**, **130b**, and a third side edge portion **132a**, **132b**. The first side edge portions **128a**, **128b** extend vertically downwardly from opposite ends of the top edge

122. The third side edge portions **132a**, **132b** extend vertically upwardly from opposite ends of the bottom edge **124**. The second side edge portions **130a**, **130b** curve downwardly and inwardly from the first side edge portions **128a**, **128b** to the third side edge portions **132a**, **132b**.

The main plate **110** includes a top portion **134**. The top portion **134** has a front surface **136** and a rear surface **138**. The top portion **134** has a top edge **140**, a bottom edge **142**, and a pair of side edges **144a**, **144b** which connect the top edge **140** to the bottom edge **142**. The top edge **140** has a length which is preferably less than a length of the bottom edge **142**. The side edges **144a**, **144b** preferably curve downwardly and outwardly from the top edge **140** to the bottom edge **142**. An aperture **146** is preferably provided through the top portion **134** generally equidistantly between the side edges **144a**, **144b**. The aperture **146** is preferably generally rectangular in configuration, but preferably is rounded at its corners.

The main plate **110** includes a bottom portion **148**. The bottom portion **148** has a top surface **150** and a bottom surface **152**. The bottom portion **148** has a front edge **154**, a rear edge **156**, and a pair of side edges **158a**, **158b** which connect the front edge **154** to the rear edge **156**. The front and rear edges **154**, **156** preferably have identical lengths and the top and bottom surfaces **150**, **152** are preferably rectangular in configuration.

The middle, top, and bottom portions **116**, **134**, **148** of the main plate **110** are all preferably integrally formed. The bottom edge **142** of the top portion **134** is connected to the top edge **122** of the middle portion **116**, with the bottom edge **142** and the top edge **122** preferably having identical lengths. The top portion **134** is angled relative to the middle portion **116**, preferably at an angle of forty-five (45) degrees. The top surface **150** of the bottom portion **148** is connected to the bottom edge **124** of the middle portion **116**, such that the rear surface **120** of the middle portion **116** is generally flush with the rear edge **156** of the bottom portion **148**. The bottom portion **148** has a length which is less than a length of the bottom edge **124** of the middle portion **116** such that equal parts of the bottom edge **124** of the middle portion **116** are exposed on either side of the bottom portion **148**. The bottom portion **148** is thus angled relative to the middle portion **116**, preferably at an angle of ninety (90) degrees.

The pins **112** of the security apparatus **102** are best illustrated in FIGS. 5-7. The pins **112** include a generally cylindrical portion **160**, a generally conical portion **162**, and a generally domed portion **164**, each of which are preferably integrally formed. The generally cylindrical portion **160** has a top edge **166** which is generally formed at an angle, preferably forty-five (45) degrees, and a bottom edge **168**. The generally conical portion **162** has a top edge **170** and a bottom edge **172**, where the top edge **170** has a larger diameter than the bottom edge **172**. The generally domed portion **164** has a top edge **174** and a bottom point **176**. The bottom edge **168** of the generally cylindrical portion **160** and the top edge **170** of the generally conical portion **162** are connected to one another and preferably have the same diameter. The bottom edge **172** of the generally conical portion **162** and the top edge **174** of the generally domed portion **164** are connected to one another and preferably have the same diameter.

The support plate **114** of the security apparatus **102** is best illustrated in FIGS. 8-10. The support plate **114** includes a top surface **178** and a bottom surface **180**. The support plate **114** has a front edge **182**, a rear edge **184**, and a pair of side edges **186a**, **186b** which connect the front edge **182** to the rear edge **184**. The front and rear edges **182**, **184** preferably

have identical lengths and the top and bottom surfaces **178**, **180** are preferably rectangular in configuration.

The security apparatus **102** is formed by welding the main plate **110**, the pair of pins **112**, and the support plate **114** together. More specifically, the pins **112** are positioned on opposite sides of the bottom portion **148** of the main plate **110** so that the generally cylindrical portion **160** of each pin **112** is positioned against the front surface **118** of the middle portion **116** of the main plate **110** and such that the angled top edges **166** of the generally cylindrical portions **160** are positioned flat against the front surface **136** of the top portion **134** of the main plate **110**. The generally cylindrical portions **160** of the pins **112** are preferably slightly distanced from the side edges **158a**, **158b** of the bottom portion **148** of the main plate **110**, and a lower portion of the generally cylindrical portions **160**, as well as the generally conical portions **162**, and the generally domed portions **164**, of the pins **112**, are positioned below the bottom portion **148** of the main plate **110**. The pins **112** are preferably welded to the main plate **110** at least at the connection of the angled top edges **166** of the generally cylindrical portions **160** to the front surface **136** of the top portion **134** of the main plate **110**. The pins **112** may further be welded to the main plate **110** at other positions as desired.

The rear edge **184** of the support plate **114** is positioned against the front surface **118** of the middle portion **116** of the main plate **110**, at a predefined distance above the bottom portion **148** of the main plate **110**, preferably generally in alignment with the connection of the second and third side edges **130a**, **132a**; **130b**, **132b** of the middle portion **116** of the main plate **110**. Thus, an elongated channel **188** is defined between the top surface **150** of the bottom portion **148** of the main plate **110** and the bottom surface **180** of the support plate **114**. The support plate **114** preferably has a length which is equal to a length of the bottom portion **148** of the main plate **110**, and the support plate **114** is generally provided in general alignment with, and in parallel relation to, the bottom portion **148** of the main plate **110**. The generally cylindrical portions **160** of the pins **112** are preferably slightly distanced from the side edges **186a**, **186b** of the support plate **114**. The support plate **114** is preferably welded to one or more of the middle portion **116** of the main plate **110** and the pins **112**.

The security apparatus **102** of the door security system **100** is thus formed, as illustrated in FIGS. 11-14.

The sleeves **104** of the door security system **100** are best illustrated in FIGS. 15-17. Each sleeve **104** is preferably formed of aluminum, but may be formed of any other suitable material. Each sleeve **104** has a shank portion **190** and a head portion **192** which are preferably integrally formed. The shank portion **190** is generally elongated and cylindrical in configuration and has a bottom end **194**, a top end **196**, and a generally cylindrical outer surface **198**. The head portion **192** has a bottom surface **200**, a top surface **202**, and a generally circular outer edge **204**. The top end **196** of the shank portion **190** is connected to the bottom surface **200** of the head portion **192**, and the generally circular outer edge **204** of the head portion **192** has a diameter which is larger than a diameter of the generally cylindrical outer surface **198** of the shank portion **190**. The head portion **192** preferably has a small thickness for reasons which will become apparent herein. An aperture **206** extends through the sleeve **104** from the top surface **202** of the head portion **192** to the bottom end **194** of the shank portion **190**. The aperture **206** may have a different dimension within the head portion **192** than in the shank portion **190**.

The attachment assembly **106** of the door security system **100** is best illustrated in FIGS. **18-29**. The attachment assembly **106** includes a strap plate **208**, a pair of washer plates **210**, a plurality of bolts **212**, and a plurality of nuts **214**.

The strap plate **208** of the attachment assembly **106** is best illustrated in FIGS. **18-20**. The strap plate **208** has a front surface **216**, a rear surface **218**, a top edge **220**, a bottom edge **222**, and opposite side edges **224a**, **224b** which connect the top edge **220** to the bottom edge **222**. The strap plate **208** has a middle portion **226**, opposite end portions **228a**, **228b**, and connecting portions **230a**, **230b**. Each of the middle portion **226**, the end portions **228a**, **228b**, and the connecting portions **230a**, **230b** are preferably rectangular in configuration. The end portion **228a** extends from the side edge **224a** to the connecting portion **230a**, and the end portion **228b** extends from the side edge **224b** to the connecting portion **230b**. The connecting portion **230a** extends angularly inwardly and forwardly from the end portion **228a** to the middle portion **226**, which the connecting portion **230b** extends angularly inwardly and forwardly from the end portion **228b** to the middle portion **226**. The middle portion **226** is thus parallel to, but offset from, the end portions **228a**, **228b**, and the end portions **228a**, **228b** are separated from one another, but are planar with one another. The connecting portions **230a**, **230b** are preferably angled relative to each of the middle and end portions **226**, **228a**, **228b** at approximately forty (40) to forty-five (45) degrees. Each of the end portions **228a**, **228b** preferably have a pair of apertures **232a**, **234a**; **232b**, **234b** provided therethrough. Each aperture **232a**, **234a**, **232b**, **234b** is preferably provided equidistant between the top edge **220** and the bottom edge **222**. The apertures **232a**, **232b** are provided proximate to the side edges **224a**, **224b**, respectively, while the apertures **234a**, **234b** are provided distal to the side edges **224a**, **224b** and proximate to the connection of the end portions **228a**, **228b** and the connecting portions **230a**, **230b**.

The washer plate **210** of the attachment assembly **106** is best illustrated in FIGS. **21-23**. Each washer plate **210** includes a front surface **236** and a rear surface **238**. The washer plate **210** has a top edge **240**, a bottom edge **242**, and a pair of side edges **244a**, **244b** which connect the top edge **240** to the bottom edge **242**. The top and bottom edges **240**, **242** preferably have identical lengths and the front and rear surfaces **236**, **238** are preferably rectangular in configuration. The washer plate **210** has a pair of apertures **246a**, **246b** provided therethrough. Each aperture **246a**, **246b** is preferably provided equidistant between the top edge **240** and the bottom edge **242**. The aperture **246a** is provided proximate to the side edge **244a** while the apertures **246b** is provided distal to the side edge **244a** and proximate to the side edge **244b**.

The bolts **212** of the attachment assembly **106** are best illustrated in FIGS. **24-26**. The attachment assembly **106** preferably includes four bolts **212**. The bolts **212** are preferably round head, square neck bolts. Each bolt **212** has a shank portion **248** and a head portion **250** connected at one end of the shank portion **248**. The head portion **250** is preferably domed in configuration and has a larger base diameter than a diameter of the shank portion **248**. The shank portion has a generally square, non-threaded portion **252** proximate to the head portion **250** and a generally cylindrical, threaded portion **254** extending from the non-threaded portion **252** to a free end of the shank portion **248**.

The nuts **214** of the attachment assembly **106** are best illustrated in FIGS. **27-29**. The attachment assembly **106** preferably includes four nuts **214**. The nuts **214** are prefer-

ably zinc-plated, steel acorn nuts. Each nut **214** has a hexagonal base portion **256** and a domed portion **258** which extends therefrom. An opening **260** is provided at the hexagonal base portion **256** and extends through the hexagonal base portion **256** and into the domed portion **258**. The opening defines a wall **262** which is preferably threaded.

The release mechanism **108** is best illustrated in FIGS. **30-32**. The release mechanism **108** is preferably formed of a rolled steel bar which has been bent to provide its desired configuration. More specifically, the release mechanism **108** has a first portion **264**, a second portion **266**, a third portion **268**, a fourth portion **270**, and a fifth portion **272**. Each of the second, third, fourth, and fifth portions **266**, **268**, **270**, **272** are planar with one another.

The first portion **264** extends from a first free end **274** of the release mechanism **108** to the second portion **266**. The second portion **266** extends straight outwardly from the first portion **264** to the third portion **268**, such that the first and second portions **264**, **266** are in alignment with one another, but with the first portion **264** being provided at an angle relative to the second portion **266**. The third portion **268** extends from the second portion **266** to the fourth portion **270**, with the third portion **268** preferably being perpendicular to the second portion **266**. The fourth portion **270** extends from the third portion **268** to the fifth portion **272**, with the fourth portion **270** preferably being perpendicular to the third portion **268**. The fourth portion **270** is preferably positioned opposite of, and in parallel position to, the second portion **266**. The fifth portion **272** extends from the fourth portion **270** to a second free end **276** of the release mechanism **108**, with the fifth portion **272** preferably being perpendicular to the fourth portion **270**. The fifth portion **272** is preferably positioned opposite of, and in parallel position to, the third portion **268**. The connections between the portions **264**, **266**, **268**, **270**, **272** are preferably smooth and curved. The third, fourth, and fifth portions **268**, **270**, **272** are generally provided in a J-shaped configuration. The first portion **264** is preferably longer than the third portion **268**, the third portion **268** is preferably longer than the second portion **266**, the second portion **266** is preferably longer than the fourth portion **270**, and the fourth portion **270** is preferably longer than the fifth portion **272**.

Each of the main plate **110**, the pair of pins **112**, and the support plate **114** of the security apparatus **102**, the strap plate **208** and the washer plate **210** of the attachment assembly **106**, and the release mechanism **108** are preferably made of steel. Alternatively, one or more of these parts may be made of aluminum, wood, or any other material known to one skilled in the art, provided that these alternative materials enable the door security system **100** to work in the manner as described hereinbelow. The sleeves **104** are preferably made of aluminum. Alternatively, the sleeves **104** may be made of steel, wood, plastic, or any other material known to one skilled in the art, provided that these alternative materials enable the door security system **100** to work in the manner as described hereinbelow.

Description of the installation and operation of the door security system **100** will now be described with reference to FIGS. **33-54**. While the door security system **100** may be installed and operated in any type of setting having a door separating a first space from a second space, the door security system **100** will be described herein as being installed and operated in connection with a door **300**, **400** which separates a classroom **500** (e.g., the first space) from a hallway **600** (e.g., the second space) in a school, where the classroom **500** and the hallway **600** share a common floor

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700. Door 300 is defined as a door which opens into the classroom 500, whereas door 400 is defined as a door which opens into the hallway 600.

Regardless of whether door 300 or door 400 is provided, initial installment of the door security system 100 is required and will be described with reference to FIGS. 33-39. Initial installment of the door security system 100 requires that a pair of holes 702 be formed in the floor 700 of the classroom 500, proximate to the door 300, 400, as illustrated in FIG. 33. The holes 702 are preferably provided on opposite sides of a center of the door 300, 400, but may be provided at any desired position along a base of the door 300, 400.

Once the holes 702 are formed, the sleeves 104 are preferably positioned in the holes 702 with the shank portions 190 being provided within the holes 702 and with the bottom surfaces 200 of the head portions 192 being positioned flat against the floor 700, as illustrated in FIG. 34. The sleeves 104 may be retained within the holes 702 and held in place relative to the floor 700 in any suitable manner, such as by an adhesive or an epoxy. Thus, the holes 702 must have a depth which is at least as large as a length of the shank portions 190 of the sleeves 104. As the top surface 202 and the circular outer edge 204 of the head portions 192 of the sleeves 104 are positioned above the floor 700, the thickness of the head portions 192 are preferably minimized as much as possible. In this regard, the head portions 192 do not prevent or impede the opening of the door 300 into the classroom 500 and, if desired, the circular outer edge 204 may taper from the bottom surface 200 to the top surface 202 (so that the top surface 202 has a smaller diameter than the bottom surface 200), or, alternatively, the head portions 192 may be entirely removed from the sleeves 104 so that the top end 196 of the shank portion 190 is generally flush with, or recessed from, the floor 700. As another option, the sleeves 104 may not be utilized at all, but this is not preferred.

In connection with door 400 only, initial installment of the attachment assembly 106 is also required, with reference to FIGS. 35-39. Also in connection with door 400 only, a gap 410 must be provided between the bottom of the door 400 and the floor 700 (a gap can be provided between the bottom of door 300 and the floor 700, but it is not required for operation of the door security system 100. When door 300 is provided between the classroom 500 and the hallway 600, the attachment assembly 106 of the door security system 100 is not installed, and the release mechanism 108 of the door security system 100 is not likely to be operated.

The attachment assembly 106 is installed by drilling first and second pairs of apertures 402a, 404a; 402b, 404b through the door 400, proximate to a lower end of the door 400. Of course, it is to be understood that the apertures 402a, 404a; 402b, 404b could be provided through the door in any desired manner. When viewed as in FIG. 35, it is apparent that the first pair of apertures 402a, 404a are provided to the left of the leftmost sleeve 104, while the second pair of apertures 402b, 404b are provided to the right of the rightmost sleeve 104. One pair of apertures 402a, 404a; 402b, 404b is preferably provided proximate to one of the sleeves 104, while the other pair of apertures 402a, 404a; 402b, 404b is preferably provided distal to the other one of the sleeves 104. As illustrated in FIG. 35, the second pair of apertures 402b, 404b is preferably provided proximate to the rightmost sleeve 104, while the first pair of apertures 402a, 404a is preferably provided distal to the leftmost sleeve 104.

With the apertures 402a, 404a; 402b, 404b properly provided in the door 400, each of the washer plates 210 are positioned to have their front surfaces 236 positioned against the side or surface of the door 400 which faces the hallway

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600, as illustrated in FIGS. 36 and 37. One washer plate 210 is positioned so that the aperture 246a is in alignment with the aperture 402a, and so that the aperture 246b is in alignment with the aperture 404a. The other washer plate 210 is positioned so that the aperture 246a is in alignment with the aperture 404b, and so that the aperture 246b is in alignment with the aperture 402b.

Each of the four bolts 212 are then inserted, shank portion 248 first, through the aligned apertures 246a, 402a; 246b, 404a; 246a, 404b; 246b, 402b until the base of the head portion 250 abuts against the rear surfaces 238 of the washer plates 210, as illustrated in FIGS. 36 and 37. When the base of the head portions 250 of the bolts 212 abut against the rear surfaces 238 of the washer plate 210, portions of the threaded portions 254 of the shank portions 248 of the bolts 212 will extend outwardly from the apertures 402a, 404a, 402b, 404b and into the classroom 500.

The strap plate 208 is then positioned to have the threaded portions 254 of the shank portions 248 of the bolts 212 be positioned through the apertures 232a, 234a, 234b, 232b thereof, with aperture 232a being in alignment with aperture 402a, aperture 234a being in alignment with aperture 404a, aperture 234b being in alignment with aperture 404b, and aperture 232b being in alignment with aperture 402b. The rear surface 218 of the end portions 228a, 228b thus are positioned against the side or surface of the door 400 which faces the classroom 500, as illustrated in FIGS. 38 and 39.

Nuts 214 are then threaded onto the threaded portions 254 of the shank portions 248 of the bolts 212 until the base portions 256 of the nuts 214 are tightly positioned against the front surface 216 of the end portions 228a, 228b of the strap plate 208. The attachment assembly 106 of the door security system 100 is thus fixedly secured to the door 400. When the attachment assembly 106 is fixedly secured to the door 400, a slot 800 is provided between the door 400 and the middle and connecting portions 226, 230a, 230b of the strap plate 208, as illustrated in FIGS. 38 and 39.

With the holes 702 formed and the sleeves 104 positioned therein, and when the attachment assembly 106 is secured to the door 400 (if door 400 is provided), further installation and operation of the door security system 100 may be performed when required. The security apparatus 102 is retained in the classroom 500, preferably in a location which is proximate to the door 300, 400, which is easily accessible, and which is in open view. For instance, one or more magnets may be provided along a wall of the classroom 500 proximate to the door 300, 400, for instance twelve (12) inches or less, and the security apparatus 102 may be secured to the magnets.

Attention is directed to FIG. 40 in connection with a description of the further installation and operation of the door security system 100 in connection with door 300. If an unauthorized person has entered the school and one or more individuals located in the classroom 500 are alerted to, or otherwise become aware of the unauthorized person's presence in the school, the individual(s) may use the door security system 100 to try and prevent (or at least delay) the unauthorized person from entering the classroom 500 through the door 300. More specifically, an individual would locate the security apparatus 102 and bring it next to the door 300. The security apparatus 102 is easily handled due to the provision of the aperture 146 through the top portion 134 of the main plate 110, thus allowing the individual to insert his/her fingers through the aperture 146 to allow for the easy gripping of the security apparatus 102. Thus, the top portion 134 of the main plate 110 of the security apparatus 102 acts as a handle portion of the security apparatus. The security

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apparatus 102 preferably is also relatively light, preferably approximately five (5) pounds, such that any individual, even a young child, would be able to pick up and move the security apparatus 102.

The pins 112 of the security apparatus 102 are then positioned over, and in general alignment with, the holes 702/sleeves 104 in the floor 700. The rear surfaces 120, 138 of the middle and top portions 116, 134 of the security apparatus 102 are positioned to face the door 300, with the bottom portion 148 and the support plate 114 (and thus the opening to the channel 188 therebetween), being provided in a non-facing relation relative to the door 300.

The security apparatus 102 is then moved downwardly so that the generally domed portions 164, the generally conical portions 162, and portions of the generally cylindrical portions 160 of the pins 112 are inserted into the apertures 206 of the sleeves 104 (or into the holes 702 if the sleeves 104 are not provided, or are missing). The configuration of the conical and domed portions 162, 164 aids in the proper insertion of the pins 112 into the apertures 206 of the sleeve 104. The apertures 206 of the sleeve 104 are preferably slightly larger than the size of the pins 112, such that any type of side-to-side movement of the pins 112 is substantially prevented. The security apparatus 102 is moved downwardly until the bottom surface 152 of the bottom portion 148 comes into contact with the head portions 192 of the sleeves 104 (if the head portions 192 are not provided on the sleeves 104, or if the sleeves 104 are not provided at all, or are missing, the bottom surface 152 of the bottom portion 148 may contact the floor 700). Thus, the sleeves 104 act as a receiving assembly of the door security system 100, the pins 112 of the security apparatus 102 act as a floor engaging portion of the security apparatus 102, and the bottom portion 148 acts as a stop member of the security apparatus 102.

With the pins 112 in place, the rear surface 120 of the middle portion 116 of the security apparatus 102 is preferably positioned flush against, or in close proximity to, the door 300, as illustrated in FIG. 40. More specifically, a distance between the door 300 and the rear surface 120 of the middle portion 116 of the security apparatus 102 is approximately one-quarter of an inch ($\frac{1}{4}$ "), although the distance between the door 300 and the rear surface 120 of the middle portion 116 of the security apparatus 102 may be larger or smaller provided that the door security system 100 operates in the manner as described herein. The top portion 134 of the security apparatus 102 is provided at an angle relative to the middle portion 116 so as to provide the individual with adequate space to handle the security apparatus 102 proximate to the door 300.

As illustrated in FIG. 40, the security apparatus 102 is thus essentially engaged with the floor 700, as the pins 112 are anchored in the sleeves 104 positioned in the floor 700, and prevents the door 300 from being opened into the classroom 500. The middle portion 116 of the security apparatus 102 thus acts as a door blocking portion of the security apparatus 102. Thus, the door security system 100 will prevent, or at least substantially delay, the unauthorized person from gaining access to the classroom 500 through the door 300. When the unauthorized person is no longer a threat to the individual(s) within the classroom 500, the individual(s) may remove the security apparatus 102 from the sleeves 104 by grabbing the top portion 134 of the security apparatus 102, preferably utilizing the aperture 146 to aid in the gripping of the top portion 134, and pulling the security apparatus 102 straight upwardly. When the pins 112 are no longer positioned within the sleeves 104, the security

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apparatus 102 can be returned to its place of storage and the door 300 can be opened into the classroom 500.

Attention is directed to FIGS. 41-54 in connection with a description of the further installation and operation of the door security system 100 in connection with door 400. If an unauthorized person has entered the school and one or more individuals located in the classroom 500 are alerted to, or otherwise become aware of, the unauthorized person's presence in the school, the individual(s) may use the door security system 100 to try and prevent (or at least delay) the unauthorized person from entering the classroom 500 through the door 400. More specifically, an individual would locate the security apparatus 102 and bring it next to the door 400. The security apparatus 102 is easily handled due to the provision of the aperture 146 through the top portion of the main plate 110, thus allowing the individual to insert his/her fingers through the aperture 146 to allow for the easy gripping of the security apparatus 102. Thus, the top portion 134 of the main plate 110 of the security apparatus 102 acts as a handle portion of the security apparatus. The security apparatus 102 preferably is also relatively light, preferably approximately five (5) pounds, such that any individual, even a young child, would be able to pick up and move the security apparatus 102.

The pins 112 of the security apparatus 102 are then positioned over the slot 800 provided between the door 400 and the strap plate 208 of the attachment assembly 106. The pins 112 are further position over, and in general alignment with, the holes 702/sleeves 104 in the floor 700. The rear surfaces 120, 138 of the middle and top portions 116, 134 of the security apparatus 102 are positioned to face the door 400, with the bottom portion 148 and the support plate 114 (and thus the opening to the channel 188 therebetween), being provided in a non-facing relation relative to the door 400.

The security apparatus 102 is then moved downwardly so that the generally domed portions 164, the generally conical portions 162, and portions of the generally cylindrical portions 160 of the pins 112 are first inserted through the slot 800, and then inserted into the apertures 206 of the sleeves 104 (or into the holes 702 if the sleeves 104 are not provided, or are missing). The configuration of the conical and domed portions 162, 164 aids in the proper insertion of the pins 112 into the apertures 206 of the sleeve 104. The apertures 206 of the sleeve 104 are preferably slightly larger than the size of the pins 112, such that any type of side-to-side movement of the pins 112 is substantially prevented. The security apparatus 102 is moved downwardly until the bottom surface 152 of the bottom portion 148 comes into contact with the head portions 192 of the sleeves 104 (if the head portions 192 are not provided on the sleeves 104, or if the sleeves 104 are not provided at all, or are missing, the bottom surface 152 of the bottom portion 148 may contact the floor 700). Thus, the sleeves 104 act as a receiving assembly of the door security system 100, while the pins 112 of the security apparatus 102 act as a floor engaging portion of the security apparatus 102.

With the pins 112 in place, the cylindrical portions 160 of the pins 112 are positioned to rest against, or be in close proximity to, the rear surface 218 of the middle portion 226 of the strap plate 208 of the attachment assembly 106. The first side edge portion 128b of the side edge 126b of the middle portion 116 of the security apparatus 102 is positioned proximate to the connection of the connecting portion 130b and the end portion 128b of the strap plate 208 of the attachment assembly 106, while the first side edge portion 128a of the side edge 126a of the middle portion 116 of the

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security apparatus 102 is positioned distal to the connection of the connecting portion 130a and the end portion 128a of the strap plate 208 of the attachment assembly 106. Furthermore, the rear surface 120 of the middle portion 116 of the security apparatus 102 is preferably positioned flush against, or in close proximity to, the door 400, as illustrated in FIGS. 41 and 42. More specifically, a distance between the door 400 and the rear surface 120 of the middle portion 116 of the security apparatus 102 is approximately one-quarter of an inch (1/4"), although the distance between the door 400 and the rear surface 120 of the middle portion 116 of the security apparatus 102 may be larger or smaller provided that the door security system 100 operates in the manner as described herein. The top portion 134 of the security apparatus 102 is provided at an angle relative to the middle portion 116 so as to provide the individual with adequate space to handle the security apparatus 102 proximate to the door 400. The top portion 134 is also preferably positioned above the strap plate 208.

As illustrated in FIGS. 41 and 42, the security apparatus 102 is thus essentially engaged with the floor 700, as the pins 112 are anchored in the sleeves 104 positioned in the floor 700, and captured between the strap plate 208 and the door 400, and thus prevents the door 400 from being opened into the hallway 600. The strap plate 208 of the attachment assembly 106 and the middle portion 116 of the security apparatus 102 thus act as door blocking portions of the security apparatus 102. Thus, the door security system 100 will prevent, or at least substantially delay, the unauthorized person from gaining access to the classroom 500 through the door 400. When the unauthorized person is no longer a threat to the individual(s) within the classroom 500, the individual(s) may remove the security apparatus 102 from the sleeves 104 and from being captured by the attachment assembly 106 by grabbing the top portion 134 of the security apparatus 102, preferably utilizing the aperture 146 to aid in the gripping of the top portion 134, and pulling the security apparatus 102 straight upwardly. When the pins 112 are no longer positioned within the sleeves 104 or within the slot 800, the security apparatus 102 can be returned to its place of storage and the door 400 can be opened into the hallway 600.

However, if, for whatever reason, the individual(s) within the classroom 500 cannot or will not remove the security apparatus 102, and if an individual in the hallway 600 needs to enter the classroom 500 (such as a school administrator or emergency personnel, e.g., a police officer or a fireman), the release mechanism 108 of the door security system 100 can be utilized by this individual to unanchor and disengage the security apparatus 102 from the floor 700 within the classroom 500, as illustrated in FIGS. 43-54. Unlike the security apparatus 102, the release mechanism 108 is preferably stored in secured location remote from the door 400 to the classroom 500, such as in an administrator's office, in a police car, or in a fire truck.

As illustrated in FIG. 43, the individual located in the hallway 600 first positions the release mechanism 108 on the floor 700 of the hallway 600 proximate to the door 400 such that the second, third, fourth, and fifth portions 266, 268, 270, 272 of the release mechanism 108 are positioned flat against the floor 700, and such that the first portion 264 is angled upwardly from the floor 700. The fourth portion 270 of the release mechanism 108 is positioned most proximate to the door 400, preferably in a parallel relationship with the door 400, and in general alignment with the washer plate 210 positioned at the right side of the door 400. As will become apparent herein, the first and second portions 264,

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266 of the release mechanism 108 act as a handle portion of the release mechanism 108, while the third, fourth and fifth portions 268, 270, 272 of the release mechanism 108 act as a security apparatus engaging portion of the release mechanism 108.

As illustrated in FIGS. 44 and 45, the release mechanism 108 is then moved forward, under the door 400 and through the slot 800 until the first and second portions 264, 266 of the release mechanism 108 are positioned proximate to the door 400 (see FIG. 44), and until the fourth and fifth portions 270, 272 of the release mechanism 108 are positioned further into the classroom 500 than is the security apparatus 102 (see FIG. 45).

As illustrated in FIGS. 46 and 47, the release mechanism 108 is then moved to the left until the third portion 268 of the release mechanism 108 abuts against one or both of the leftmost pin 112 of the security apparatus 102 and the head portion 192 of the leftmost sleeve 104 (when viewed from the classroom 500, as shown in FIG. 47).

As illustrated in FIGS. 48 and 49, the release mechanism 108 is then moved back toward the individual in the hallway 600 until a portion of the fifth portion 272 of the release mechanism 108, including at least the free end 276 thereof, is positioned within the channel 188 of the security apparatus 102, between the bottom portion 148 of the main plate 110 and the support plate 114.

As illustrated in FIGS. 50 and 51, the release mechanism 108 is then rotated to the right (when viewed from the hallway 600, as shown in FIG. 50) by the individual in the hallway 600 so that the second portion 266 of the release mechanism 108 comes to a position where it is substantially perpendicular to the floor 700 (see FIG. 50). This rotational movement of the release mechanism 108 also causes the fourth and fifth portions 270, 272 of the release mechanism 108 to likewise rotate. As a portion of the fifth portion 272 is positioned in the channel 188 between the bottom portion 148 of the main plate 110 and the support plate 114, the fifth portion 272 engages the support plate 114 to lift the security apparatus 102 upward, thereby lifting the pins 112 out of the sleeves 104. As the fifth portion 272 lifts the security apparatus 102, the fifth portion 272 slides to the left within the channel 188 (as viewed in FIG. 51).

As illustrated in FIGS. 52 and 53, continued rotation of the release mechanism to the right (as viewed from the hallway 600, as shown in FIG. 52) causes the first portion 264 of the release mechanism 108 to be positioned in a generally parallel positioned relative to, but offset from, the floor 700. Such continued rotation causes the fourth portion 270 of the release mechanism 108 to come to a position which is substantially perpendicular to the floor 700, and causes the fifth portion 272 of the release mechanism 108 to further slide to the left in the channel 188 (as viewed from the classroom 500, as shown in FIG. 53), thereby unanchoring the pins 112 from the sleeves 104 and moving the security apparatus 102 within the slot 800 to the left, such that the pins 112 are no longer aligned with the sleeves 104 (as viewed from the classroom 500, as shown in FIG. 53). The strap plate 208 is preferably positioned at a height above the door 400 so as not to interfere with the rotational movements of the release mechanism 108.

As illustrated in FIG. 54, once the security apparatus 102 is unanchored from the floor 700 and the pins 112 are moved out of alignment with the sleeves 104, the release mechanism 108 can be moved forwardly by the individual in the hallway 600 so as to disengage the fifth portion 272 of the release mechanism 108 from within the channel 188 of the security apparatus 102. The domed portions 164 of the pins

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112 of the security apparatus 102 will then rest on the floor 700, but the security apparatus 102 will be maintained in a standing position as it will remain captured within the slot 800 between the door 400 and the strap plate 208. The release mechanism 108 can then be pulled by the individual in the hallway 600 so that the release mechanism 108 moves between the pins 112 of the security apparatus 102 and through the slot 410 between the door 400 and the floor 700. As the security apparatus 102 is no longer anchored in the floor 700, the door 400 can then be opened into the hallway 600.

It is to be understood that the release mechanism 108 of the door security system 100 could also be utilized to unanchor the security apparatus 102 from the floor 700 when the security apparatus 102 is preventing the opening of door 300 into the classroom 500. The manner in which the release mechanism 108 would unanchor the security apparatus 102 in relation to door 300 would be identical to that in relation to door 400.

Thus, it is to be understood that the security apparatus 102 of the door security system 100 can be anchored within the sleeves 104 positioned in the floor 700 (and in the slot 800 in the case of an outwardly opening door 400) in both a quick and easy manner, even by a small child, in the event where one or more unauthorized individuals has entered the facility in which the room 500 is provided, e.g., in the event of a lockdown or emergency in a school. The door security system 100 thus does not require the use of keys or alarms, or the execution of complicated procedures—the security apparatus 102 can just be dropped into place to lock the door 300, 400. From within the room 500, the security apparatus 102 can be quickly and easily unanchored from the floor 700 by simply pulling upward on the security apparatus 102. Conversely, from outside of the room 500, the security apparatus 102 can also be quickly and easily unanchored from the floor 700 through quick use of the release mechanism 108.

It is to be recognized that the door security system 100 is suitable for use in a number of different environments, including schools, offices and residences. With regard to schools and offices, these environments are typically subject to jurisdictional fire codes. While fire codes vary from jurisdiction to jurisdiction, unlike many other types of door security systems, the door security system 100 of the present invention has been found to comply with a number of different jurisdictional fire codes as the door security system 100 can be disengaged and removed from outside the room 500 in which it is installed.

The door security system 100 also provides significant strength improvements as compared to other prior art door security systems. As stated, the pins 112 are preferably formed of solid steel and are each designed to provide 8,000 pounds per square inch (“PSI”) of tensile strength. Thus, each security apparatus 102, which has two pins 112, provides 16,000 PSI of tensile strength toward the prevention of the door 300, 400 being opened.

Furthermore, the door security system 100 when not in use (e.g., with only the sleeves 104 and attachment assembly 106 in place), poses no tripping or other hazards.

The door security system 100 may also lead to lower insurance premiums for environments where the door security system 100 is installed/utilized.

While not presently illustrated, if desired, the sleeves 104 could be outfitted with some type of cover so as to prevent dirt or other objects from falling into the apertures 206 of the sleeves 104. The covers could be of a removable/reinstallable type, or the covers could be provided in a manner

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where, if the security apparatus 102 is to be used, the pins 112 of the security apparatus 102 could essentially puncture through the covers, with the covers “breaking away”, thereby allowing the pins 112 to move into their desired position within the apertures 206 of the sleeves 104.

The use of the terms “a” and “an” and “the” and similar referents in the context of describing the invention (especially in the context of the following claims) are to be construed to cover both the singular and the plural, unless otherwise indicated herein or clearly contradicted by context. Recitation of ranges of values herein are merely intended to serve as a shorthand method of referring individually to each separate value falling within the range, unless otherwise indicated herein, and each separate value is incorporated into the specification as if it were individually recited herein. All methods described herein can be performed in any suitable order unless otherwise indicated herein or otherwise clearly contradicted by context. The use of any and all examples, or exemplary language (e.g., “such as”) provided herein, is intended merely to better illuminate the disclosed embodiments of the invention and does not pose a limitation on the scope of the invention unless otherwise claimed. No language in the specification should be construed as indicating any non-claimed element as essential to the practice of the invention. It is further to be understood that the drawings are not necessarily drawn to scale.

Preferred embodiments of this invention are described herein, including the best mode known to the inventor for carrying out the invention. It should be understood that the illustrated embodiments are exemplary only, and should not be taken as limiting the scope of the invention.

The invention is claimed as follows:

1. A door security system configured for use in connection with a door, the door security system comprising:

a security apparatus comprising a floor engaging portion and a door blocking portion, the security apparatus being provided in a first space adjacent to a first side of the door, the door blocking portion configured to block the door from opening into the first space, the floor engaging portion configured to engage a floor provided in the first space in a manner which retains the security apparatus in place relative to the floor, the floor extending into the first space and a second space; and

a release mechanism comprising a handle portion and a security apparatus engaging portion, the handle portion being configured to be manipulated by a user in the second space adjacent to a second side of the door, the security apparatus engaging portion being connected to the handle portion and configured to be extended by the user into the first space through a slot provided between a bottom of the door and the floor, the handle portion configured to be manipulated by the user to cause the security apparatus engaging portion to engage the security apparatus in a manner which causes the floor engaging portion to disengage from the floor such that the door is no longer blocked from opening into the first space.

2. The door security system as defined in claim 1, further comprising a receiving assembly, the receiving assembly being provided in the floor provided in the first space, the receiving assembly configured to receive the floor engaging portion of the security apparatus therein, thereby allowing the floor engaging portion to engage the floor provided in the first space.

3. The door security system as defined in claim 1, further comprising an attachment assembly, the attachment assem-

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bly configured to be secured to the door and to provide a slot between the first side of the door and the attachment assembly, the door blocking portion of the security apparatus configured to be positioned within the slot when the floor engaging portion of the security apparatus is engaged with the floor, the attachment assembly configured to block the door from opening into the second space.

4. The door security system as defined in claim 1, wherein the security apparatus comprises a handle portion, the handle portion being connected to the door blocking portion of the security apparatus.

5. A door security system comprising:

a security apparatus comprising a first portion which is configured to block a door from being opened into a first space, and a second portion which is configured to engage a floor inside the first space, the first portion comprising a door facing surface and a first space facing surface, the second portion comprising a pair of pins which are permanently secured to the first space facing surface of the first portion and which extend below the first portion to engage the floor inside the first space, whereby when the pair of pins are engaged with the floor, the security apparatus blocks the door from opening into the first space; and,

wherein the first portion includes a floor stop member which extends inwardly from the first space facing surface, and away from the door facing surface, the floor stop member being positioned between the pair of pins.

6. The door security system as defined in claim 5, wherein the security apparatus further comprises a support plate which is secured to the first space facing surface and which extends inwardly from the first space facing surface, and away from the door facing surface, the support plate being positioned between the pair of pins, the support plate being positioned above the floor stop member such that a channel is defined between the support plate and the floor stop member.

7. The door security system as defined in claim 6, wherein the floor extends into the first space and a second space, the system further comprising a release mechanism, the release mechanism configured to be manipulated by a user from the second space which is provided on an opposite side of the door from the first space, the release mechanism configured to be extended by the user into the first space through a slot provided between the bottom of the door and the floor so as to be engaged within the channel of the security apparatus to disengage the pair of pins of the security apparatus from the floor such that the door is no longer blocked from opening into the first space.

8. The door security system as defined in claim 5, further comprising a pair of sleeves which each have an aperture provided therethrough, each sleeve being configured to be positioned within a corresponding hole formed in the floor of the first space, each sleeve being configured to receive a portion of a corresponding one of the pair of pins therein, thereby engaging the pair of pins with the floor.

9. The door security system as defined in claim 5, wherein the security apparatus further comprises a third portion which is secured to the first portion, the third portion having an aperture provided therethrough such that the third portion is configured to act as a handle portion of the security apparatus, each pin being secured to the third portion, the aperture being provided between the pins.

10. The door security system as defined in claim 5, wherein the security apparatus further comprises a third portion which is secured to the first portion, the third portion

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having an aperture provided therethrough such that the third portion is configured to act as a handle portion of the security apparatus.

11. The door security system as defined in claim 10, wherein the third portion extends from a top of the first portion in an upward and inward manner from the first space facing surface, and away from the door facing surface.

12. A door security system comprising:

a security apparatus comprising a first portion which is configured to block a door from being opened into a first space, and a second portion which is configured to engage a floor inside the first space, the first portion comprising a door facing surface and a first space facing surface, the second portion comprising a pair of pins which are permanently secured to the first space facing surface of the first portion and which extend below the first portion to engage the floor inside the first space, whereby when the pair of pins are engaged with the floor, the security apparatus blocks the door from opening into the first space; and,

further comprising an attachment assembly, the attachment assembly configured to be secured to the door and to provide a slot between the door and the attachment assembly, the first portion of the security apparatus configured to be positioned within the slot when the pair of pins are engaged with the floor, thereby preventing the door from opening into the second space.

13. A method of using a door security system, the method comprising the steps of:

providing a door which separates a first space from a second space;

providing a floor extending into the first and second spaces, the door being positioned over the floor, the door being separated from the floor to define a gap between the door and the floor;

providing a security apparatus comprising a floor engaging portion and a door blocking portion, the security apparatus being provided in the first space adjacent to a first side of the door;

providing a release mechanism configured to be manipulated by a user from the second space and comprising a handle portion and a security apparatus engaging portion, the security apparatus engaging portion being connected to the handle portion;

engaging the floor engaging portion of the security apparatus with the floor provided in the first space, thereby retaining the security apparatus in place relative to the floor, and thereby causing the door blocking portion to block the door from opening into the first space;

moving the security engaging portion of the release mechanism through the gap to provide that at least a portion of the security apparatus engaging portion of the mechanism is positioned in the first space; and manipulating the handle portion of the release mechanism to cause the security apparatus engaging portion of the release mechanism to engage the security apparatus in a manner which causes the floor engaging portion to disengage from the floor in the first space such that the door is no longer blocked from opening into the first space.

14. The method as defined in claim 13, further comprising the steps of:

providing a receiving assembly in the portion of the floor provided in the first space;

engaging the floor engaging portion of the security apparatus with the receiving assembly, thereby retaining the security apparatus in place relative to the floor, and

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thereby causing the door blocking portion to block the door from opening into the first space.

15. The method as defined in claim 13, further comprising the steps of:

- providing an attachment assembly;
- securing the attachment assembly to the door to provide a slot between the first side of the door and the attachment assembly; and
- positioning the security apparatus within the slot, thereby causing the security apparatus and the attachment assembly to block the door from opening into the second space.

16. A method of using a door security system, the method comprising the steps of:

- providing a door which separates a first space from a second space;
- providing a floor extending into the first and second spaces, the door being positioned over the floor, the floor comprising a pair of holes therein in the first space;
- providing a security apparatus of the door security system in the first space, the security apparatus comprising first and second portions, the first portion comprising first and second opposite surfaces, the second portion comprising a pair of pins which are permanently secured to the second surface of the first portion and which extend below the first portion;
- positioning the first surface of the first portion of the security apparatus to face the door;
- positioning the pair of pins of the security apparatus over the pair of holes provided in the portion of the floor in the first space; and
- lowering the pair of pins of the security apparatus into the pair of holes provided in the portion of the floor in the first space, thereby engaging the security apparatus with the floor, and thereby allowing for the first portion of the security apparatus to block the door from opening into the first space; and, further comprising the steps of:
 - providing the first portion with a floor stop member which extends inwardly from the second surface of the first portion, and away from the first surface of the first portion, the floor stop member being positioned between the pair of pins; and
 - wherein the lowering of the pair of pins of the security apparatus into the pair of holes provided in the portion of the floor in the first space further comprises lowering the security apparatus until the floor stop member is prevented from further downward movement relative to the portion of the floor in the first space.

17. The method as defined in claim 16, further comprising the steps of:

- providing the security apparatus with a support plate which is secured to the second surface of the first portion and which extends inwardly from the second surface of the first portion, and away from the first surface of the first portion, the support plate being positioned between the pair of pins, the support plate being positioned above the floor stop member such that a channel is defined between the support plate and the floor stop member;
- providing a gap between a bottom of the door and the floor;

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- providing a release mechanism for manipulation by a user, the release mechanism comprising a handle portion and a security apparatus engaging portion; and
- manipulating the release mechanism from the second space to position the handle portion in the second space and the security apparatus engaging portion in the first space, with the release mechanism spanning the gap between the bottom of the door and the floor;
- manipulating the handle portion of the release mechanism to cause the security apparatus engaging portion to be positioned within the channel of the security apparatus; and
- manipulating the handle portion of the release mechanism to cause the security apparatus engaging portion to engage the security apparatus within the channel to disengage the pair of pins of the security apparatus from the pair of holes in the portion of the floor in the first space such that the door is no longer blocked from opening into the first space.

18. The method as defined in claim 16, further comprising the steps of:

- providing a pair of sleeves which each have an aperture provided therethrough;
- positioning the pair of sleeves into the pair of holes provided in the portion of the floor in the first space; and
- wherein the lowering of the pair of pins of the security apparatus into the pair of holes provided in the portion of the floor in the first space further comprises lowering the pair of pins of the security apparatus into the apertures of the pair of sleeves, thereby engaging the security apparatus with the floor, and thereby allowing for the first portion of the security apparatus to block the door from opening into the first space.

19. A method of using a door security system, the method comprising the steps of: providing a door which separates a first space from a second space; providing a floor extending into the first and second spaces, the door being positioned over the floor, the floor comprising a pair of holes therein in the first space; providing a security apparatus of the door security system in the first space, the security apparatus comprising first and second portions, the first portion comprising first and second opposite surfaces, the second portion comprising a pair of pins which are permanently secured to the second surface of the first portion and which extend below the first portion; providing an attachment assembly; securing the attachment assembly to the door to provide a slot between the door and the attachment assembly, the slot being provided in the first space and being positioned above the pair of holes in the portion of the floor in the first space; positioning the first surface of the first portion of the security apparatus to face the door; positioning the security apparatus over the slot; positioning the pair of pins of the security apparatus over the pair of holes provided in the portion of the floor in the first space; and lowering the pair of pins of the security apparatus through the slot and into the pair of holes provided in the portion of the floor in the first space, thereby engaging the security apparatus with the floor and securing the security apparatus within the slot, thereby allowing for the first portion of the security apparatus to block the door from opening into the first space and allowing the attachment assembly of the security apparatus to block the door from opening into the second space.

* * * * *

EXHIBIT B



(12) **United States Patent**
Seelbinder et al.

(10) **Patent No.:** **US 11,105,130 B2**
 (45) **Date of Patent:** **Aug. 31, 2021**

(54) **EMERGENCY DOOR LOCK SYSTEM AND METHOD**

(56) **References Cited**

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(73) Assignee: **Legacy Barricades, Inc.**, Grand Rapids, MI (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 144 days.

Primary Examiner — Travis R Hunnings
 (74) *Attorney, Agent, or Firm* — Gardner, Linn, Burkhardt & Ondersma LLP

(21) Appl. No.: **16/545,545**

(22) Filed: **Aug. 20, 2019**

(65) **Prior Publication Data**
 US 2020/0063475 A1 Feb. 27, 2020

(57) **ABSTRACT**

Related U.S. Application Data

(60) Provisional application No. 62/867,454, filed on Jun. 27, 2019, provisional application No. 62/722,433, filed on Aug. 24, 2018.

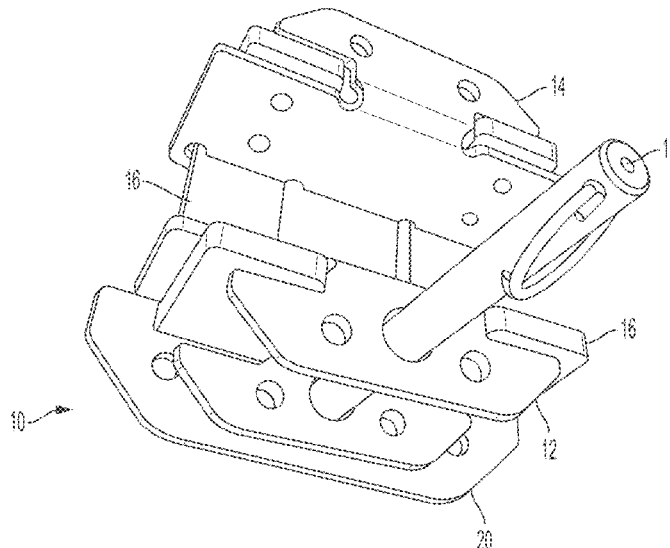
An emergency door lock system and method is provided for securing a door during an emergency situation. The emergency door lock system or barricade includes a portable removable lock pin, an interior door bracket, an exterior door bracket, and a set of u-shaped clamp brackets. The clamp brackets provide support to the interior bracket and the exterior bracket and a set of threaded screws through the clamp brackets provide pressure to the lock system to securely attach it to a door. The removable lock pin enters through a pin slot in the interior bracket and then engages into a remote pin slot in a floor or a wall. The lock pin engages the interior bracket and the remote pin slot to provide a secure robust lock or barricade with the door. The emergency door lock system is disassemblable for removal for emergency access. An optional alarm system may be included.

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E05C 19/18 (2006.01)
G08B 21/02 (2006.01)
G08B 5/36 (2006.01)
E05C 1/04 (2006.01)

(52) **U.S. Cl.**
 CPC **E05C 19/184** (2013.01); **E05C 1/04** (2013.01); **G08B 5/36** (2013.01); **G08B 21/02** (2013.01)

(58) **Field of Classification Search**
 CPC E05C 19/184
 See application file for complete search history.

18 Claims, 12 Drawing Sheets



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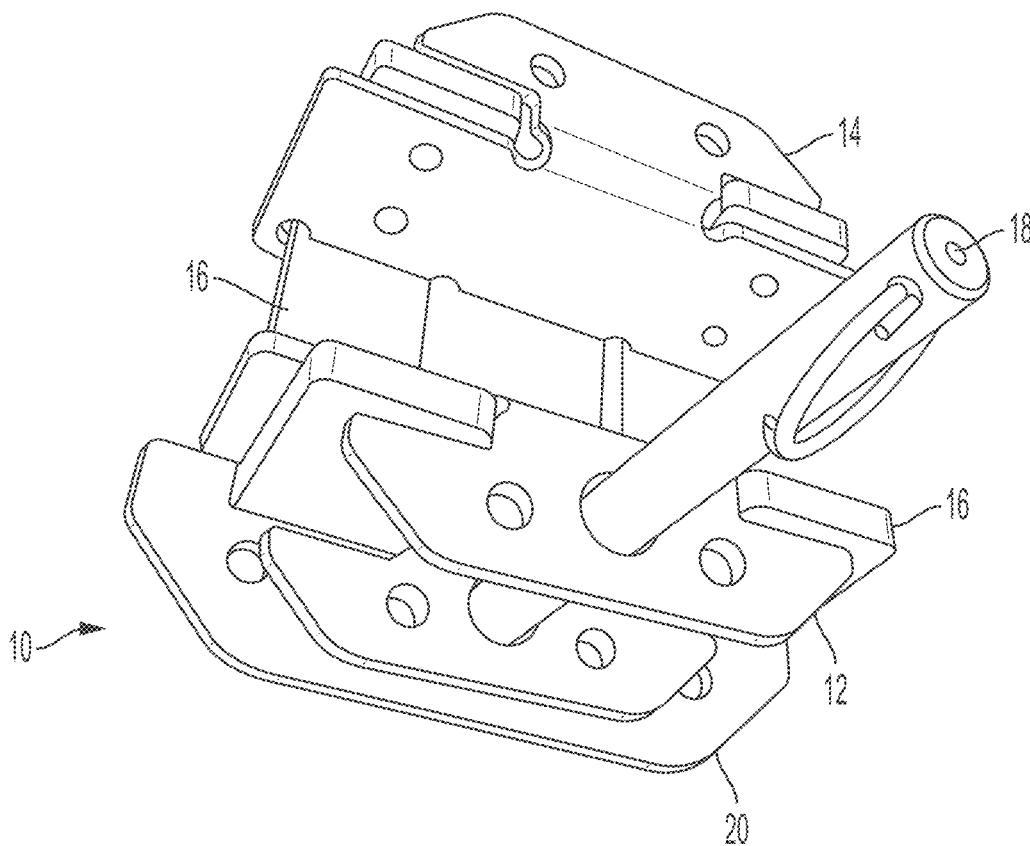


FIG. 1

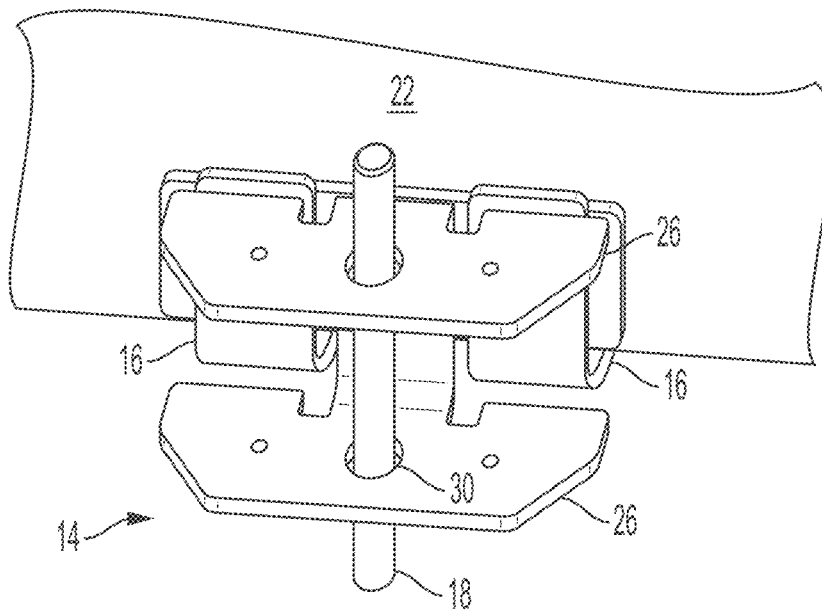


FIG. 2

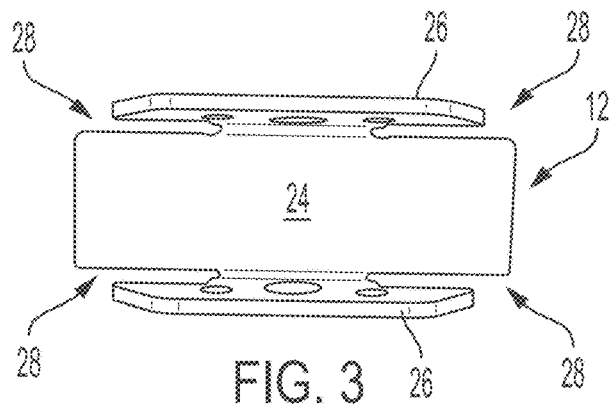


FIG. 3

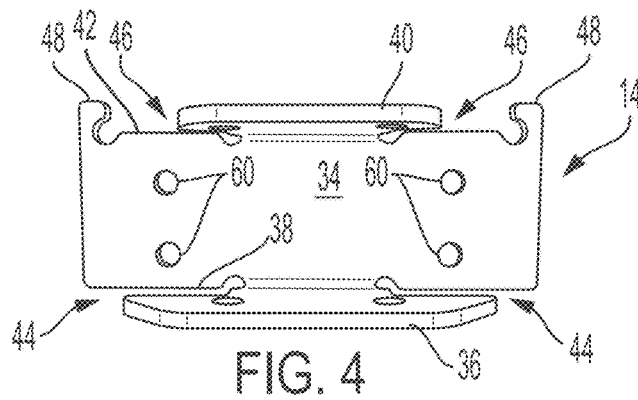


FIG. 4

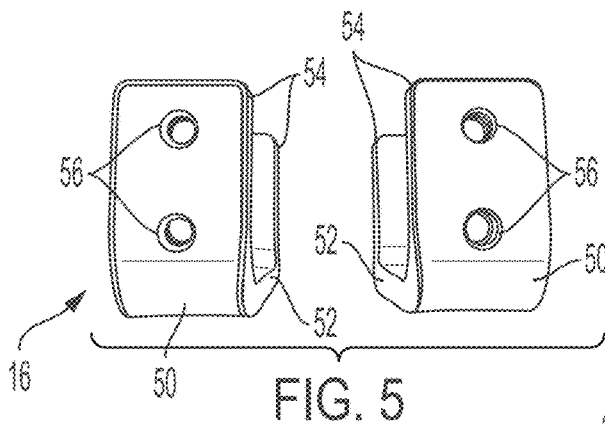


FIG. 5

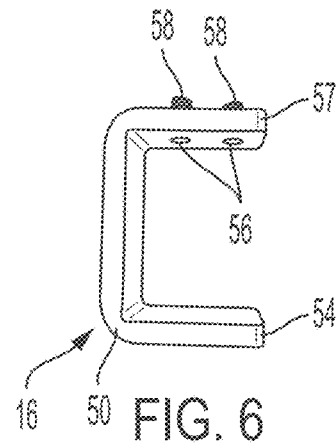


FIG. 6

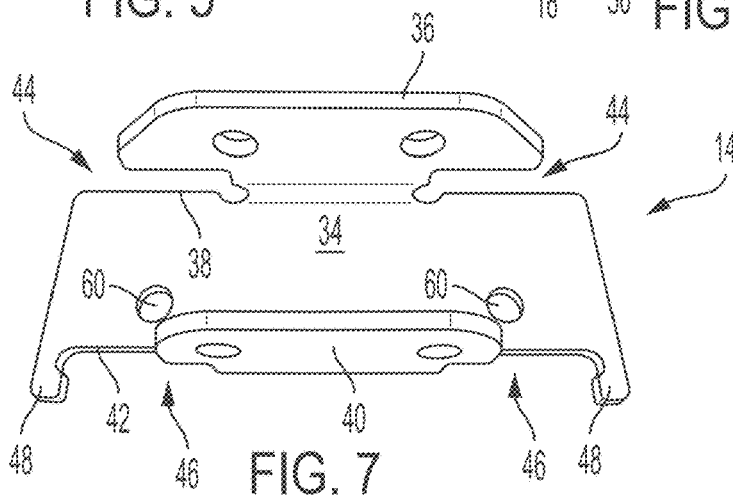


FIG. 7

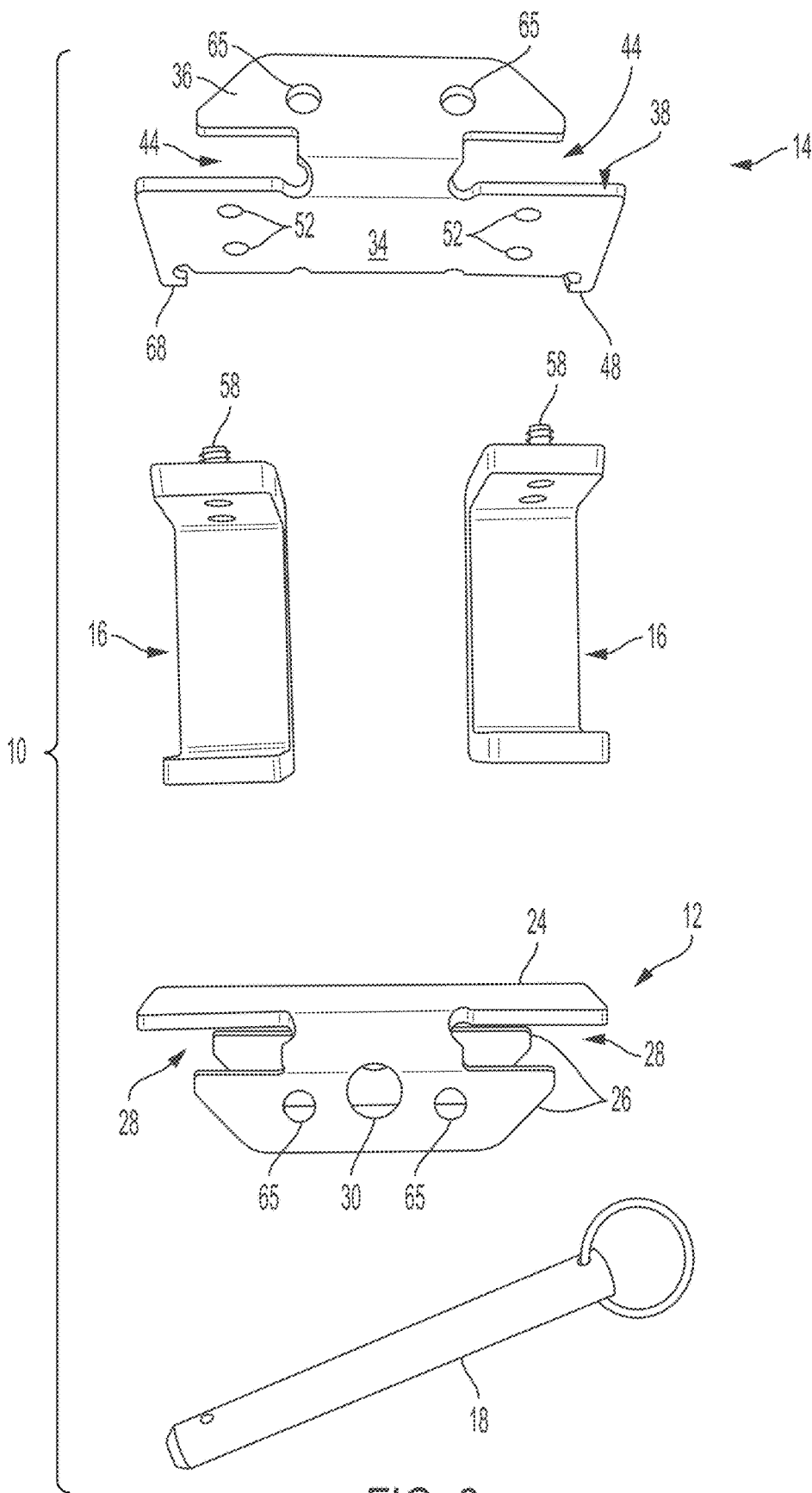


FIG. 8

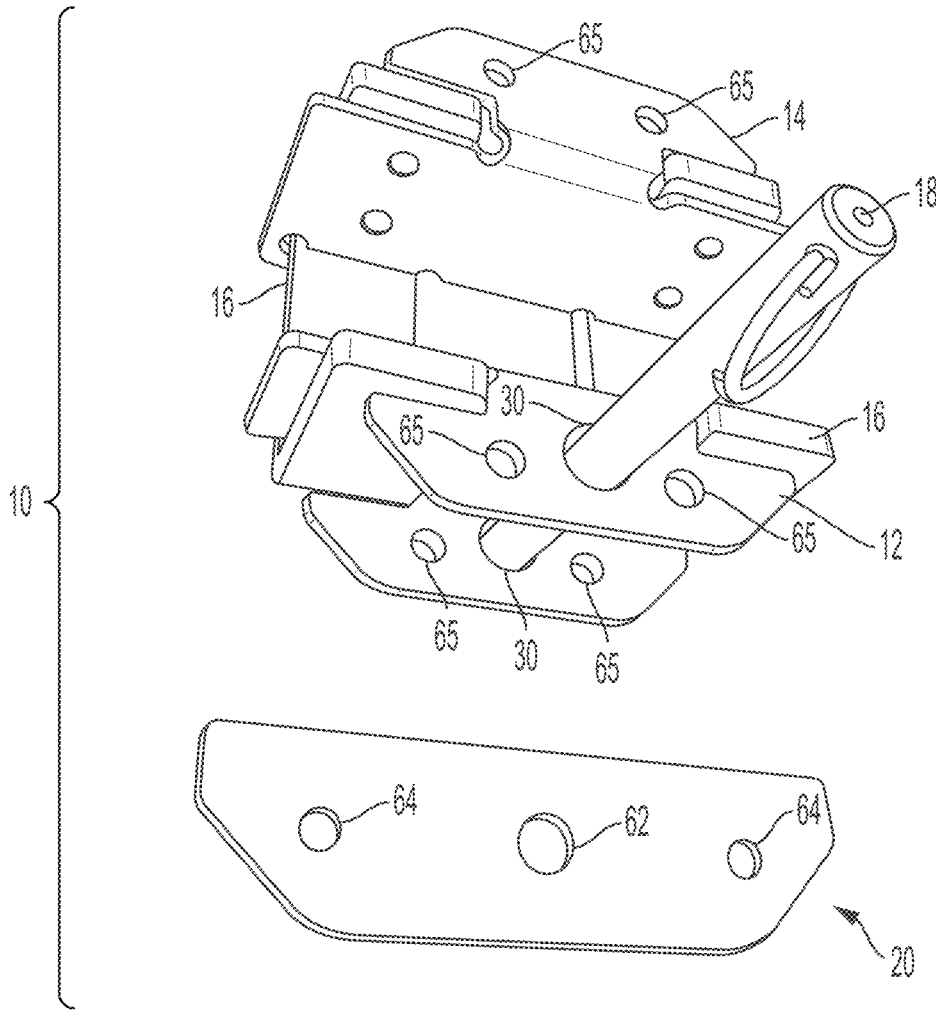


FIG. 9

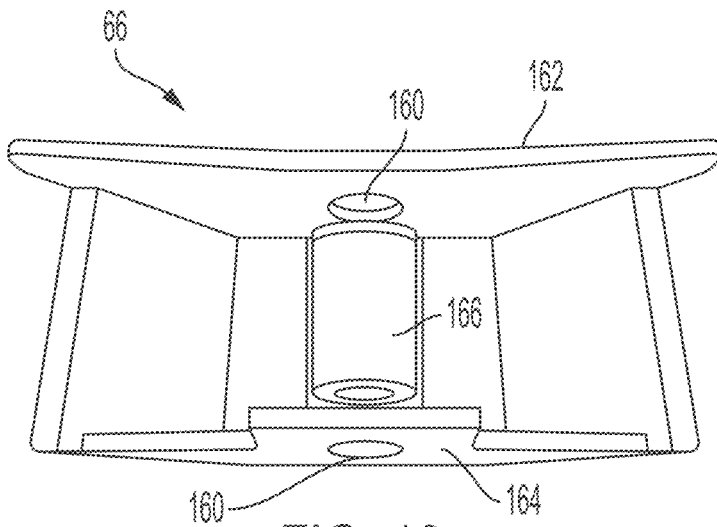


FIG. 10

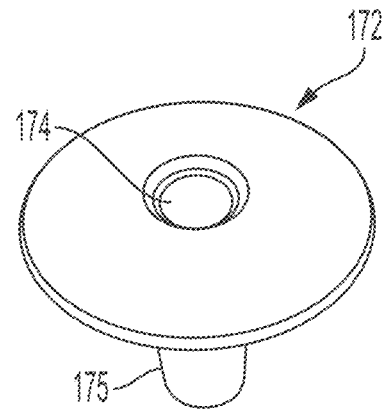


FIG. 11

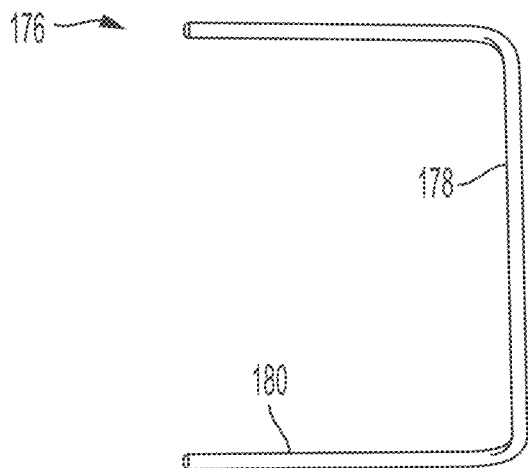


FIG. 12

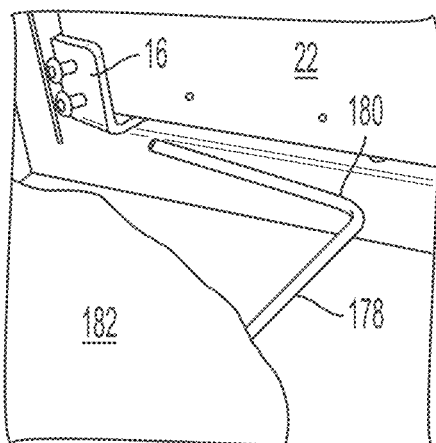


FIG. 13A

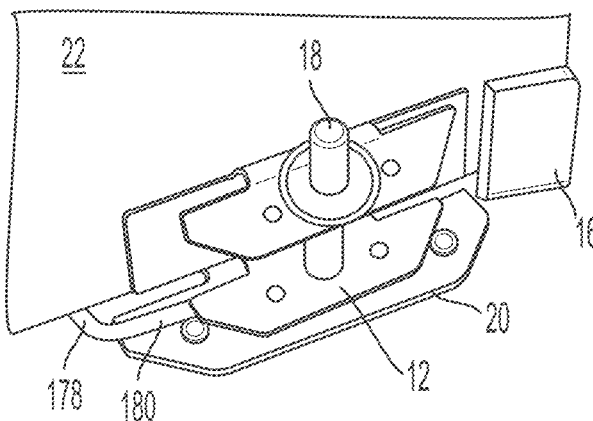


FIG. 13B

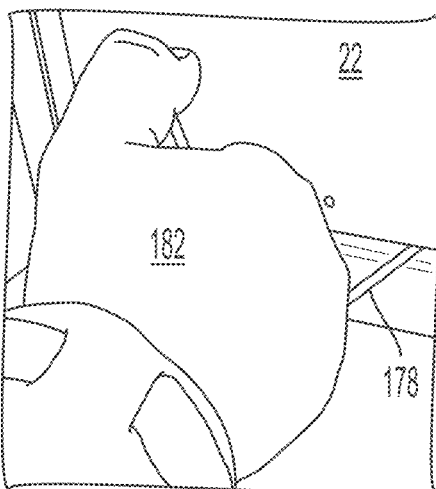


FIG. 13C

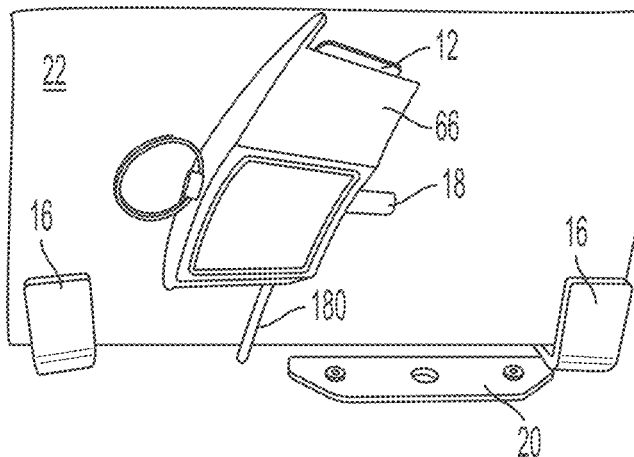


FIG. 13D

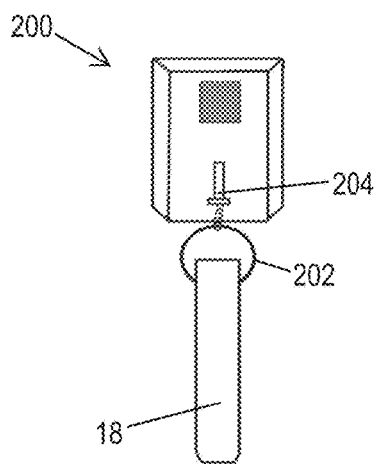


FIG. 14

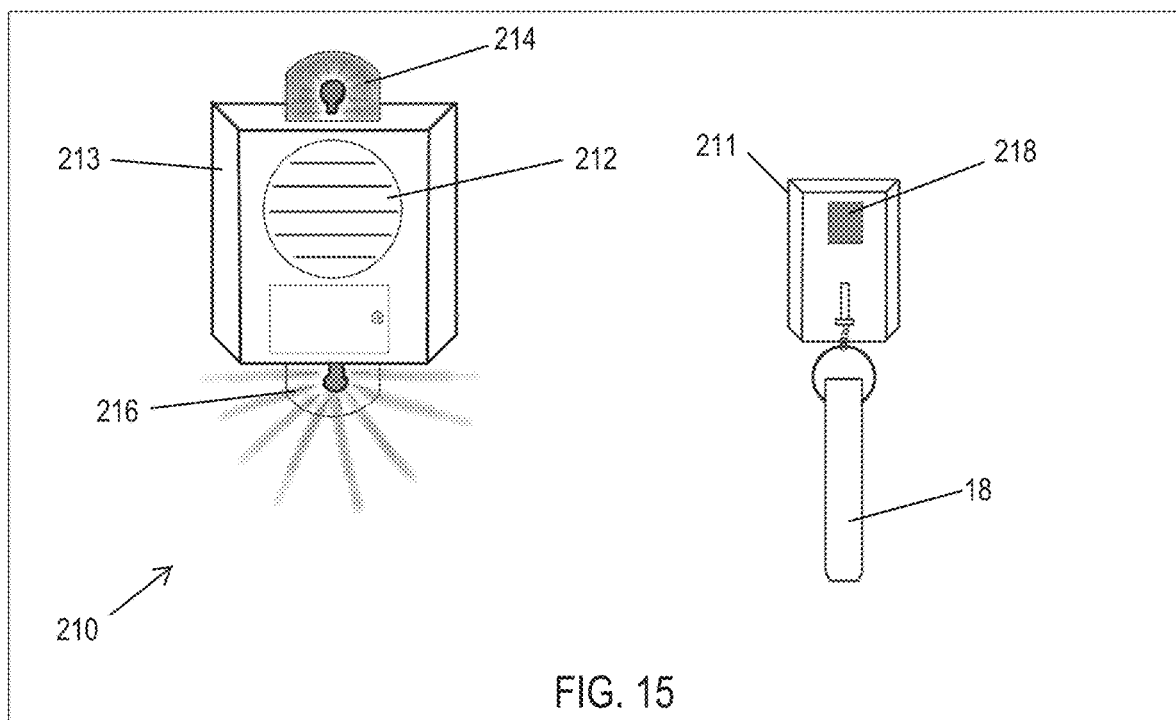
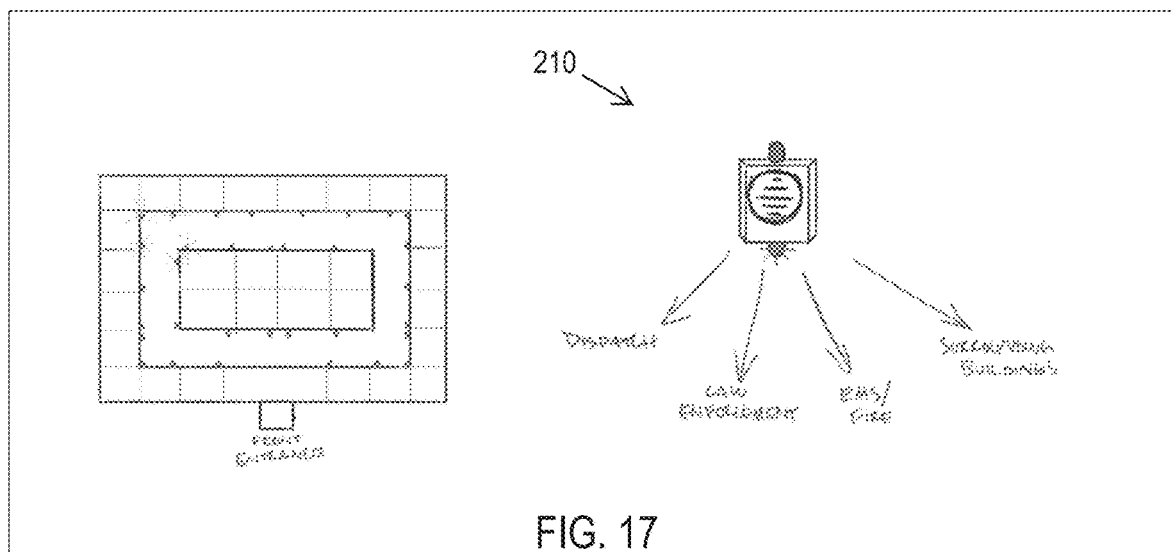
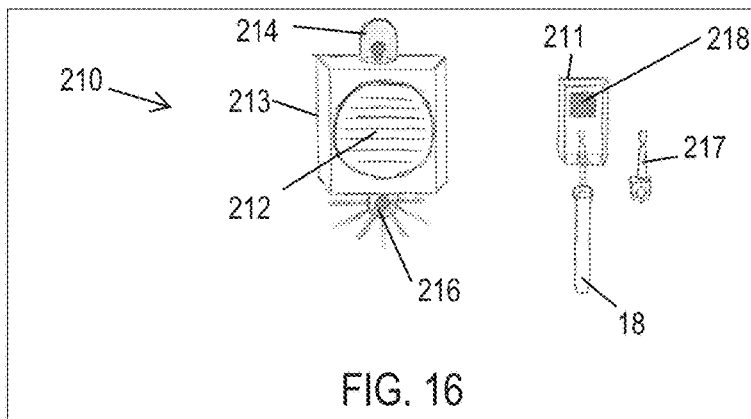
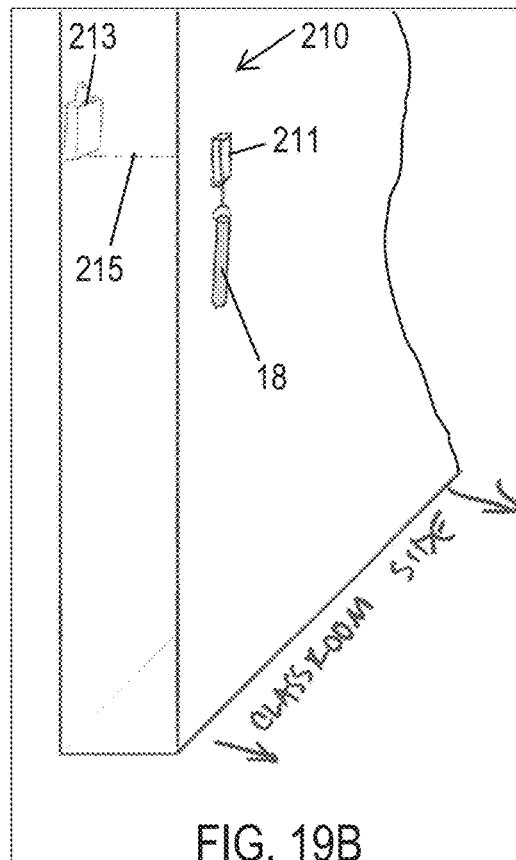
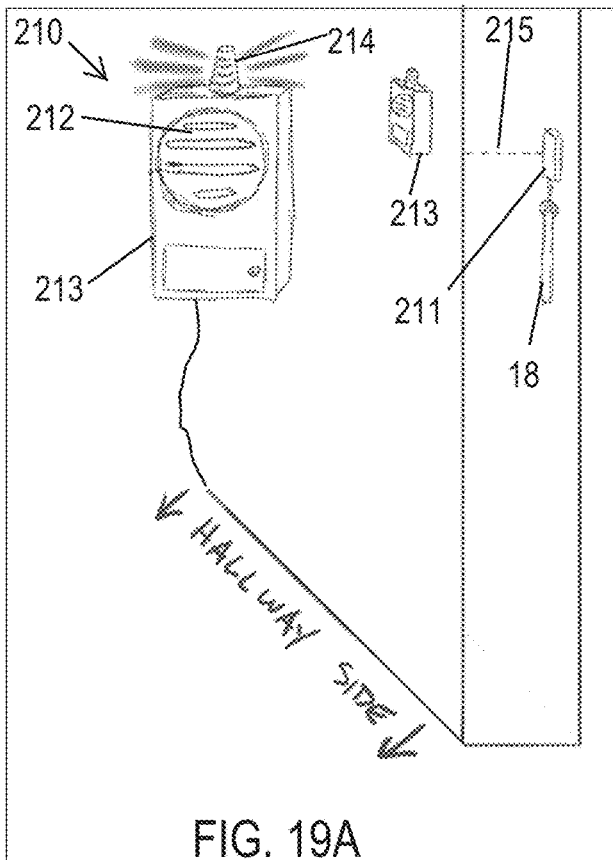
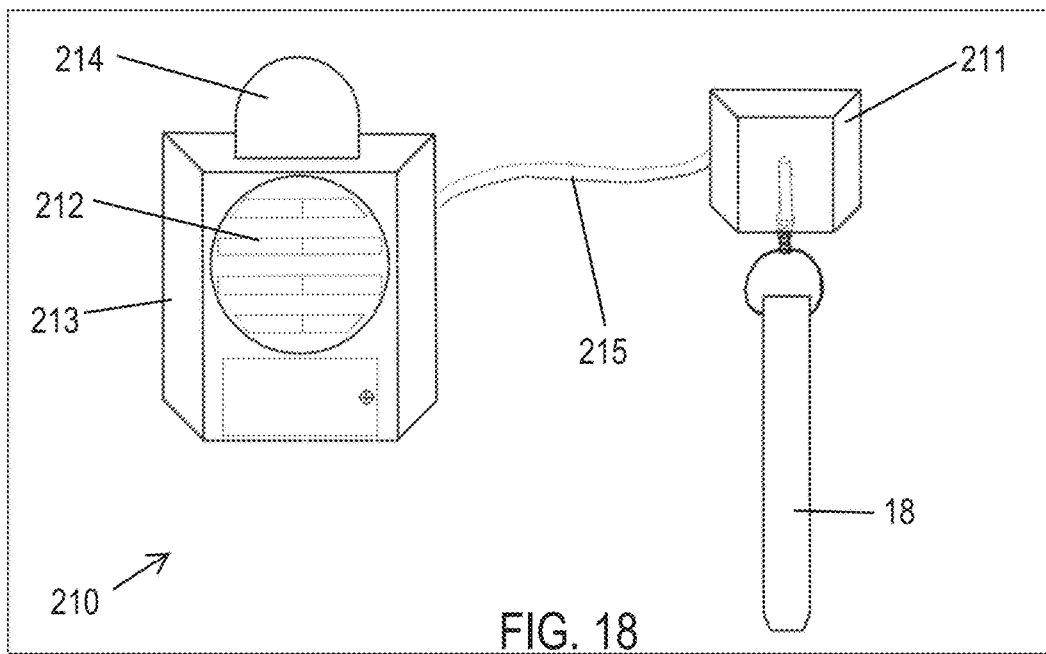


FIG. 15





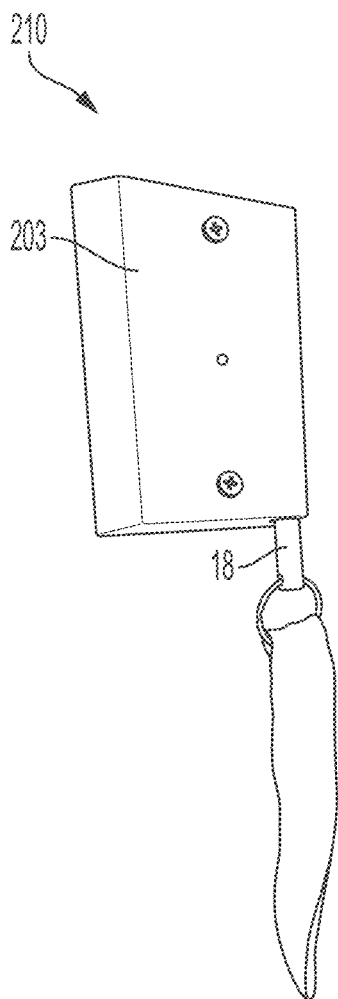


FIG. 20

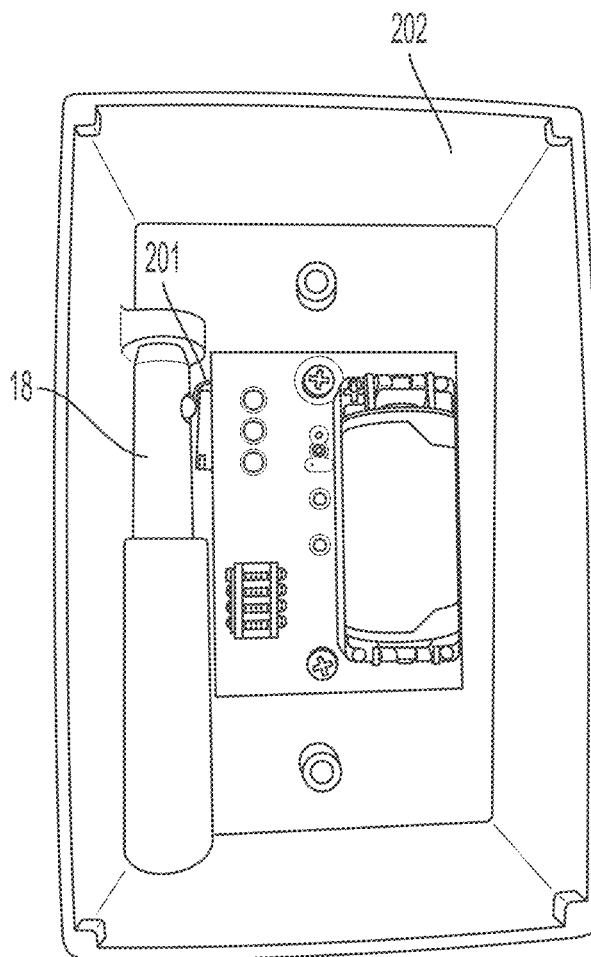


FIG. 21

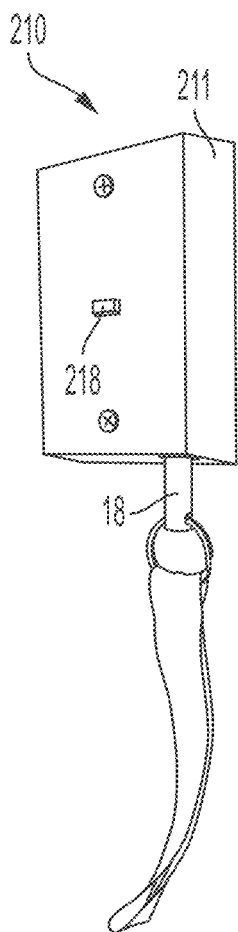


FIG. 22

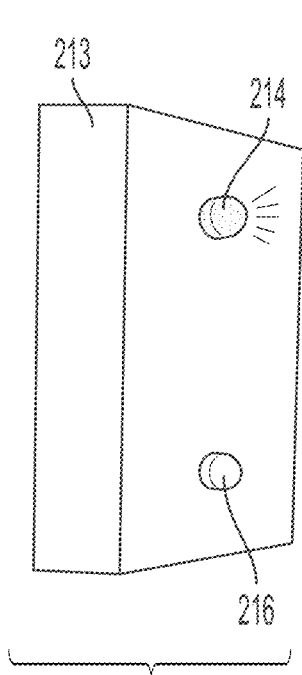


FIG. 23A

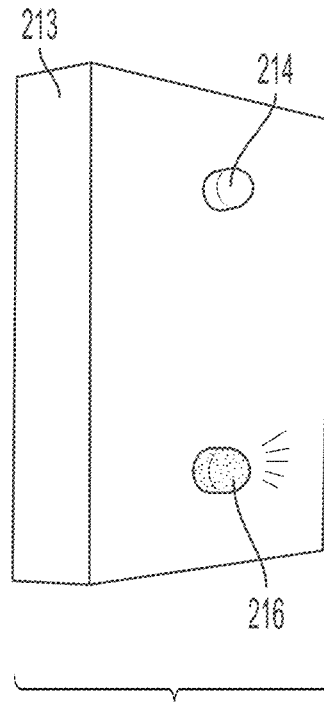


FIG. 23B

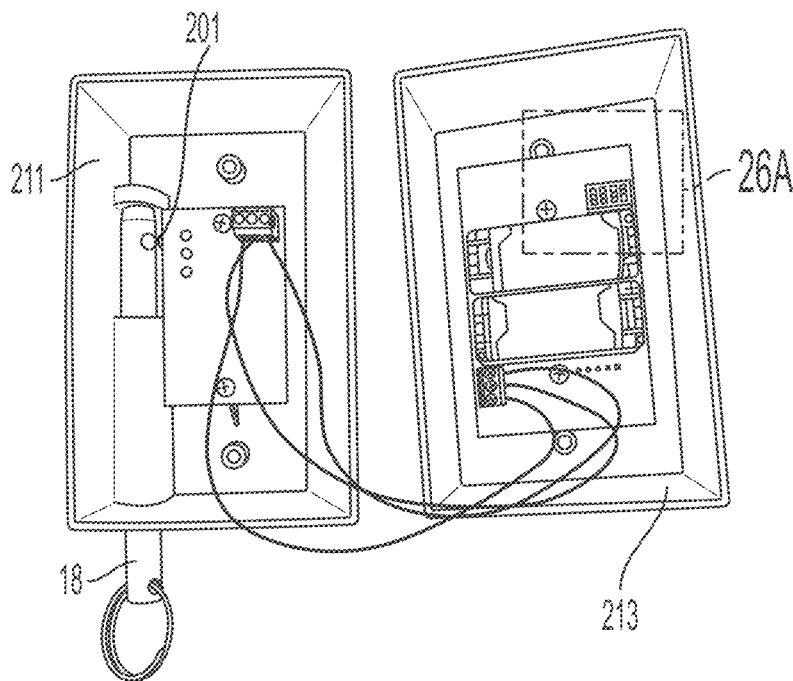


FIG. 24

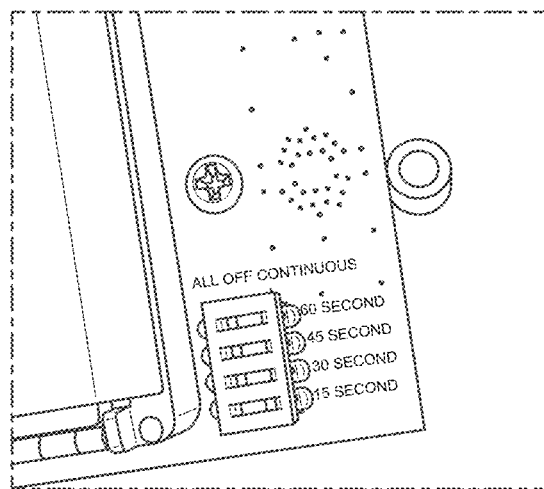


FIG. 24A

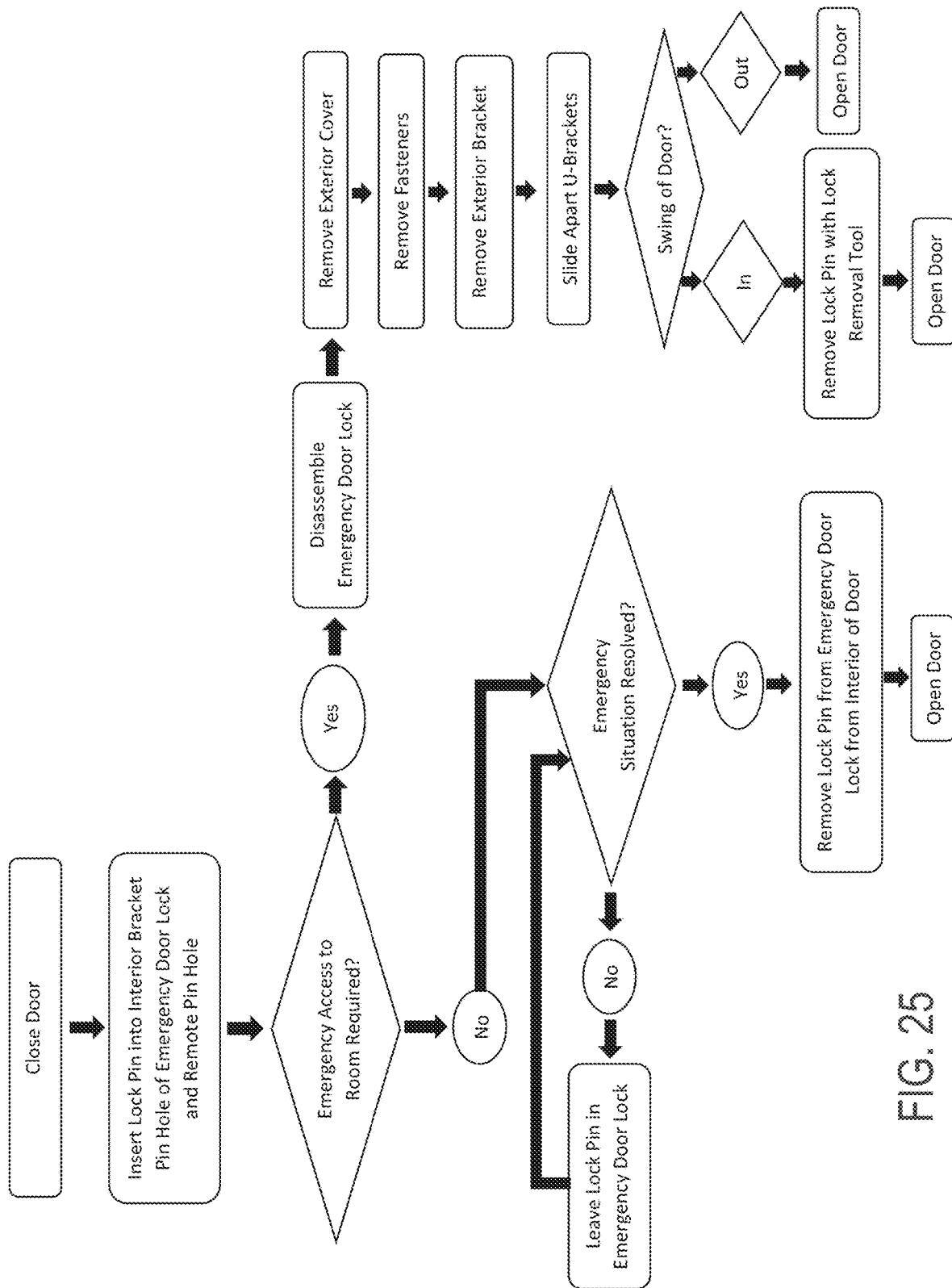


FIG. 25

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EMERGENCY DOOR LOCK SYSTEM AND METHOD**CROSS REFERENCE TO RELATED APPLICATION**

The present application claims priority of U.S. provisional application Ser. No. 62/722,433 filed Aug. 24, 2018, and Ser. No. 62/867,454 filed Jun. 27, 2019, which are hereby incorporated herein by reference in their entireties.

FIELD OF THE INVENTION

The present invention is directed to door lock systems, and in particular to an emergency door lock system.

BACKGROUND OF THE INVENTION

Conventional door lock systems provide minimal security in lock down situations. Conventional door lock systems are often quickly breached or easily disabled from the outside of the door rendering them useless for impeding or stopping intruders.

SUMMARY OF THE INVENTION

The present invention provides a door lock or barricade system for securing or barricading a door in emergency situations, such as an active shooter situation, and a method for using the system. The door lock system may be used with an out-swing or outward swinging door or an in-swing or inward swinging door. An interior clamp bracket, an exterior clamp bracket, and a set of u-shaped brackets define a clamp system to attach the lock system onto a door. A lock pin is inserted into a pin slot through the interior clamping bracket and engages with a remote pin slot to create a lock or barricade between the door and the remote pin slot. The lock pin is removable from the interior clamp bracket and is portable. The lock system is disassemblable to be removed by emergency personnel in situations such as a fire.

In one form of the present invention, an emergency door lock system includes an interior door clamp bracket, and exterior door clamp bracket, a set of u-shaped brackets for supporting and clamping the interior and exterior bracket onto a door. The interior bracket including a pin slot for accepting and supporting a removably insertable lock pin. A plurality of threaded holes are disposed within at least one portion of each u-bracket such that a threaded fastener is threaded into each hole and tightened to apply pressure to the exterior clamp bracket creating a clamping force on the door between the interior bracket and the exterior bracket. The lock pin is configured to enter into and at least partially pass through the interior bracket and to simultaneously enter into and engage with a remote pin slot to lock or barricade between the lock system, door, and remote pin slot. The remote pin slot may be defined by a hole in a floor, a wall, a doorjamb, or the like. The lock system is configured to be disassembled to remove the lock system while the lock pin is engaged to allow emergency personnel to remove the lock system and enter through the door.

According to one aspect, the interior bracket is defined by a rigid plate material, such as a steel plate, having a back plate, an upper flange and a lower flange formed from one contiguous piece of plate material. The upper flange is disposed on the upper edge of the back plate and the lower flange is disposed on the lower edge of the back plate. A pin support hole is disposed through each of the upper flange

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and the lower flange. The pin support holes are configured to accept and engage the lock pin. The lock pin and the pin support holes may have one of several cross sections, such as a circle, a square, a rectangle, a slit, a triangle, a star, a t-shape, or the like, allowing for the lock pin to enter into and engage the pin support holes. A plurality of cutouts are defined by a space between the back plate and both the upper and the lower flange, each cutout is configured for accepting a portion of one of the u-bracket.

The exterior bracket is defined by a rigid plate material, such as a steel plate, having a back plate, an upper flange and a lower flange formed from one contiguous piece of plate material. The upper flange is disposed on the upper edge of the back plate and the lower flange is disposed on the lower edge of the back plate. A plurality of holes are disposed in the back plate such that a fastener may pass through each hole to engage the door. A plurality of cutouts are defined by a space between the back plate and the upper flange, each cutout is configured for accepting a portion of one of the u-bracket. A plurality of cutouts are defined by a space between the back plate and the lower flange, each cutout is configured for accepting a portion of one of the u-bracket.

The u-shaped brackets or u-brackets are each defined by a rigid material, such as steel, carbon fiber, or the like. The u-shaped bracket are formed from one contiguous piece of the rigid material. Each u-bracket is defined by a bottom portion and two leg portions, such that each leg portion is disposed at one of the ends of the bottom portion and extending perpendicularly from the bottom portion. The bottom portion of the u-shaped bracket has a thickness that is less than the space between the door and the adjacent surface, such as a floor, a wall, a doorjamb, or the like, such that the u-shaped bracket does not engage or contact the adjacent surface when the door lock system is mounted to the door. A plurality of threaded holes are disposed on at least one of the leg portions of the u-bracket such that a threaded fastener is disposed in each threaded hole. The u-brackets are configured to fit in the cutouts defined by the open space between either the interior bracket back plate and its flanges or the exterior bracket back plate and its flanges. The u-bracket legs having threaded holes are positioned on the exterior side of the door to interact and engage the exterior bracket.

The lock system clamp portions including the interior bracket, the exterior bracket, and the u-brackets coordinate to clamp onto and securely attach to the door, such as on the bottom or the side of the door. The threaded fasteners disposed in the u-bracket legs are tightened through the u-bracket threaded holes and apply pressure onto the back plate of the exterior bracket causing an opposite pressure to be applied between the opposite legs of the u-bracket and the back plate of the interior bracket. The pressure produced from the threaded fasteners provides a clamping force onto the door between the back plate of the interior bracket and the back plate of the exterior bracket, securing the lock system to the door.

In another embodiment, the threaded fasteners pass through a plurality of corresponding holes in the exterior bracket back plate and are threaded until the tips of the fasteners interact with the outer surface of the door such that a crimp is formed between the door surface and the tip of the threaded fastener.

In another embodiment, a floor plate having a hole defining a remote pin slot is disposed in a floor directly below the interior bracket when the lock system is attached to the door and the door is in a closed orientation. The remote pin slot is disposed at a location substantially verti-

cally below the location of the pin slot of the interior bracket such that the lock pin is simultaneously entered through and engaged with the interior bracket and the floor plate. The lock pin and the remote pin slot may have one of several cross sections, such as a circle, a square, a rectangle, a slit, a triangle, a star, a t-shape, or the like, allowing for the lock pin to enter into and engage the remote pin slot.

In another embodiment, a lock pin floor sleeve having an interior hole at least larger in diameter than the outer diameter of the lock pin defines a remote pin slot that is disposed in a floor directly below the lock pin holes of the interior bracket when the lock system is attached to the door and the door is in a closed orientation.

In one embodiment, an interior cover is disposed over the interior bracket to conceal and protect the interior bracket. The interior cover removably attached to the interior bracket. The interior cover includes pin holes on the upper and lower portions to allow passage of the lock pin through the pin slot of the interior bracket. An exterior cover is disposed of the exterior bracket to conceal and protect the exterior bracket. The exterior cover is removably attached to the exterior bracket. The interior cover and the exterior cover are removable to provide access to installers or emergency personnel to disassemble and remove the emergency lock system. In an emergency situation, emergency personnel may remove the exterior cover to access the threaded fasteners disposed in the u-bracket legs. Emergency personnel may loosen or remove the threaded fasteners and therefore reduce or remove the clamping pressure on the door allowing the lock system clamp portions to disengage the door, the u-brackets may then be separated or slid sideways relative to the plane of the door such that the interior bracket is no longer engaged with the door. Thus, the interior bracket and the lock pin no longer impede opening the door.

In one embodiment, a lock removal tool is provided that is configured to assist emergency personnel in removing the lock system when the lock system is installed on a door that swings in toward the lock pin, wherein the lock system would impede the door from opening unless the lock pin is disengaged from the floor. The lock removal tool includes a main shaft and at least one leg perpendicularly fixed to the main shaft, such that when the main shaft is rotated the perpendicular leg raises or lowers depending on the direction of rotation of the main shaft. The perpendicular leg is configured to engage at least a portion of the interior bracket to lift the bracket and the lock pin away from the floor.

In an additional embodiment, the lock pin is removably mounted to a wall in proximity to the lock system to enable any individual to place the lock pin into the lock system to secure a door. Optionally, an alarm system is provided in proximity to the lock system and the lock pin is removably coupled to the alarm system, such that when the lock pin is removed from the alarm system an alert is emitted from the alarm system. The alert from the alarm system may be an audible alert from a speaker, a visual alert from a light source, or a combination of audible and visual alerts. The alert of the alarm system provides a deterrent from students or others from tampering with or taking the lock pin when there is no emergency situation. The alarm system is configured to operate on replaceable battery power. Optionally, the alarm system is hardwired into the building electricity supply for power.

The alarm system may utilize a commercially available alarm system activated by the removal of a pin, a key, a chain, or the like, wherein the lock pin is coupled to the pin of the commercially available alarm system. Commercially

available examples of alarm systems that are suitable for the alarm system include the SABRE PA-01, PA-NBCF-01, or PA-RAINN-01 Personal Alarms.

In another embodiment, the alarm system includes an interior housing unit mounted on a wall on the interior side of the door and an exterior housing unit mounted on a wall on the exterior side of the door in proximity to the lock system. The components of the interior housing and the exterior housing are in wired communication by a wire passing through the wall. Preferably, the alert from the alarm system is programmable to disarm after a specified time of operation, such that emergency personnel are not exposed to extended periods of loud noises or bright lights, or such that an adequate amount of time has passed to ensure that emergency personnel are alerted by the alert. The alarm system including an interior and exterior housing provides useful benefits including a deterrent from students or others from tampering with or taking the lock pin, alerting emergency personnel of a potential emergency event, alerting emergency personnel to the location of an emergency event, alerting emergency personnel if the room is secured, and additional benefits.

Therefore, the present invention provides an emergency lock system for easily securing or barricading a door during an emergency situation, such as an active shooter situation. The door lock system is configured to be robust for adequately securing a door and to be simple to operate for untrained or lightly trained users. The door lock system is configured to be disassembleable and removable from the door by emergency response personnel for emergency access purposes.

These and other objects, advantages, purposes, and features of the present invention will become more apparent upon review of the following specification in conjunction with the drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of the emergency door lock system, according to the present invention;

FIG. 2 is a perspective view of the interior side of the emergency door bracket attached to a door;

FIG. 3 is a perspective view of the interior lock pin side securing bracket of the emergency door lock system;

FIG. 4 is a perspective view of the exterior side securing bracket of the emergency door lock system;

FIG. 5 is a perspective view of the u-brackets of the emergency door lock system;

FIG. 6 is a perspective view of the side of one of the u-brackets of the emergency door lock system with screws threaded into threaded holes;

FIG. 7 is a perspective view of the exterior side securing bracket of the emergency door lock system;

FIG. 8 is an exploded perspective view of the emergency door lock system;

FIG. 9 is a perspective view of the emergency door lock system separated from the floor plate;

FIG. 10 is a perspective view of the interior of the exterior concealing beauty cover including a lock pin guide sleeve;

FIG. 11 is a perspective view of a lock pin floor sleeve of the emergency door lock system;

FIG. 12 is a perspective view of a lock pin removal tool of the emergency door lock system;

FIGS. 13A-13D are perspective views of an emergency personnel disassembling the lock system, depicting sequential steps of using the lock pin removal tool to remove the lock pin located on the interior side of the door, FIGS. 13A

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and 13C depict views from the exterior side of the door, and FIGS. 13B and 13D depict views from the interior side of the door;

FIG. 14 is a perspective view of an interior alarm system coupled with the lock pin for use with the emergency door lock system;

FIG. 15 is a perspective view of an alarm system coupled with the lock pin for use with the emergency door lock system including an exterior unit and an interior unit;

FIG. 16 is another perspective view of the alarm system of FIG. 15 including an actuation key for arming and disarming the alarm system;

FIG. 17 is a perspective view of the alarm system of FIG. 15, including an audible sensor for detecting specific audible events;

FIG. 18 is another perspective view of the alarm system of FIG. 15;

FIGS. 19A-19B are perspective views of the alarm system of FIG. 15 as viewed from an exterior, hallway side, of a door, and an interior, classroom side, of a door, respectively.

FIG. 20 is a perspective view of an alarm system coupled with a lock pin in accordance with the present invention.

FIG. 21 is a perspective view of an interior of the alarm system of FIG. 20.

FIG. 22 is a perspective view of another alarm system coupled with a lock pin in accordance with the present invention.

FIG. 23A is a perspective view of exterior side alert lights of the alarm system of FIG. 22.

FIG. 23B is another perspective view of the exterior side alert lights of the alarm system of FIG. 22.

FIG. 24 is a perspective view of an interior of the alarm system of FIG. 22;

FIG. 24A is an enlarged view of the region designated 24A in FIG. 24; and

FIG. 25 is a block diagram of a method for securing a door in accordance with the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to the drawings and the illustrative embodiments depicted therein, an emergency door lock system 10 provides a door lock or barricade system for use in lock down situations, such as an active shooter situation (FIG. 1). Door lock system 10 includes an interior door clamp bracket 12, and exterior door clamp bracket 14, at least two u-brackets 16, a lock pin 18, and a floor plate 20 to provide an emergency lock to quickly secure a door 22, including inswing and outswing doors, during an emergency event. Specifically, door lock system 10 is fitted to a door, such as a school classroom door, such that a user can quickly install the lock pin 18 into the lock system 10 to lock down a classroom. Door lock system 10 is able to be disassembled from the exterior of the door to allow emergency personnel to remove the lock system 10 in the event that the user on the interior is unable to remove the lock pin 18. Preferably, the door lock system 10 mounts to a door 22 substantially without damaging or disfiguring the door 22.

In the illustrated embodiments, the lock system 10 is removably mounted onto the door 22 with interior bracket 12, exterior bracket 14, and u-brackets 16. Interior bracket 12 is disposed on the interior side of door 22 while exterior bracket 14 is disposed on the exterior of door 22 (FIGS. 1 and 2). U-brackets 16 are positioned under the door 22 and married to respective brackets 12 and 14 on the interior and exterior of the door 22. Floor plate 20 is positioned and fixed

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to the floor beneath door 22 substantially respective to the position of the interior bracket 14 when the door is in a closed orientation such that lock pin 18 may engage the interior bracket 12 and the floor plate 20 simultaneously.

The interior bracket 12 includes back plate 24, two flange plates 26, and two lock pin holes 30 (FIGS. 2 and 3). Each flange plate 26 is perpendicularly fixedly connected to the back plate 24 on a transverse edge, such that the flange plates 26 are on opposite edges of the back plate 26. A plurality of cut-outs 28 are defined between the flange plates 26 and the back plate 24 to accept a portion of the u-bracket 16. A lock pin hole 30 is disposed in each of the flange plates 26 to allow the lock pin 18 to pass through each lock pin hole 30. The interior bracket 12 are constructed of a sufficiently rigid material, such as steel, aluminum, carbon fiber, or the like. The interior bracket 12 may be formed from a contiguous piece of material that is bent or cut to define the required shape.

The exterior bracket 14 includes a back plate 34, a top flange plate 36, and a bottom flange plate 40 (FIG. 4). The top flange plate 36 is perpendicularly fixed on a top edge 38 of the back plate 34 and the bottom flange plate 40 is perpendicularly fixed on a bottom edge 42 of the back plate 34. A plurality of cut-outs 44 are defined between the top flange plate 36 and the back plate 34. A plurality of cut-outs 46 are defined between the bottom flange plate 40 and the back plate 34. Cut-outs 44 and 46 are configured to accept a portion of the u-bracket 16. Optionally, and as shown in FIG. 6, retaining tabs 48 are disposed on the extreme ends of the bottom edge 42 of the back plate 34 for retaining the u-brackets 16 during installation of the lock system 10 onto the door 22. The exterior bracket 14 are constructed of a sufficiently rigid material, such as steel, aluminum, carbon fiber, or the like. The exterior bracket 14 may be formed from a contiguous piece of material that is bent or cut to define the required shape.

The u-brackets 16 are each defined by a u-shaped angular member 50. The angular member 50 includes a lower portion 52 and two leg portions 54 (FIGS. 5 and 6). Each leg portion 54 extends perpendicular from one end of the lower portion 52. As shown in FIG. 1, each leg portion is configured to insert into the opening defined by cut-outs 28, 44, and 46 of the respective interior bracket 12 or exterior bracket 14. The u-brackets 16 are constructed of a sufficiently rigid material, such as steel, aluminum, carbon fiber, or the like. The exterior bracket 14 may be formed from a contiguous piece of material that is bent or cut to define the required shape.

A plurality of threaded holes 56 are disposed in at least one of the leg portions 54. A mechanical fastener, such as a threaded screw 58 is threaded into each of the threaded holes 56 (FIGS. 5 and 6). The threaded screws 58 are mechanically operable to apply pressure to the back plate 34 of exterior bracket 14 to create a clamping force on the door 22 between the exterior bracket 14 and the interior bracket 12 to secure the lock system 10 onto the door 22. The threaded screw 58 may be a set screw type fastener. Preferably, the threaded screw 58 is a flat tip screw.

Optionally, as illustrated in FIGS. 4 and 7, a plurality of holes 60 are disposed in the back plate 34 of the exterior bracket 14 substantially relative to the location of the threaded holes 56 in the u-bracket 16. Each hole 60 allows the threaded screw 58 to pass through the back plate 34 and contact the door 22 to further secure the lock system 10 to the door 22. Preferably, the threaded screw 58 interacts with the outer surface or "skin" of the door, such that a crimp, indentation, divot, or the like is formed in the door 22

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material from the tip of the threaded screw 58. Optionally, the threaded screw 58 pierces the door 22 “skin” such that the threaded screw 58 penetrates the “skin” of the door 22 such that the threads of the threaded screw 58 internally engages the door 22.

In one embodiment, the floor plate 20 includes a hole defining a remote floor pin hole or pin slot 62 and a plurality of anchor holes 64 (FIG. 9). The floor plate is configured to be disposed on the floor underneath the door 22 corresponding to the position of the portion of the lock system 10 mounted on the door 22. The location of the floor pin hole 62 is positioned such that when the door 22 is in the closed position the lock pin 18 is inserted through lock pin holes 30 of the interior bracket 12 and passes through the floor pin hole 62 to secure the door 22 in a closed position. In the event of emergency, a user, carrying or possessing the portable lock pin 18, inserts the lock pin through the interior bracket 12 and into the floor pin hole 62 to engage the interior bracket 12 and the floor pin hole 62 forming a lock or barricade for the door 22 to provide deterrence to a would be intruder.

In another embodiment, a lock pin floor sleeve 172 having an interior hole 174 at least larger in diameter than the outer diameter of the lock pin 18 is fixedly disposed in the floor at a position such that when the door 22 is in the closed position the lock pin 18 is inserted through lock pin holes 30 of the interior bracket 12 and passes through the floor pin sleeve 174 to secure the door 22 in a closed position. The floor sleeve 172 includes a pin shaft 175 extending downward concentric to the interior hole 174, such that the lock pin 18 is insertable into a pin shaft 175 of the floor sleeve 172 that is embedded into the floor.

Optionally, the lock pin 18, the lock pin hole 30, and the floor pin hole 62 may be defined by a cross section other than the circular cross section shown, such as a square, a rectangle, a slit, a triangle, a star, a t-shape, or the like, while allowing the lock pin 18 to enter into and through the lock pin hole 30 and to enter into and to engage the floor pin hole 62. In the embodiment illustrated in FIGS. 1 and 2, lock pin 18 has a uniform cross section along its entire length. Optionally, lock pin 18 may have a generally uniform cross section along an operative region, such as the region that slides into floor pin hole 62, and another generally uniform cross section of different size or configuration along a different operative region, such as the region that slides within lock pin holes 30. A knob, handle, ring or other grasping element may be included on lock pin 18 above the generally uniform cross section region. Additionally, a slot and groove system may be used to engage the interior bracket 12 with a remote location such as a floor, a wall, a doorjamb, or the like.

The lock system 10 is disassembleable and removable to provide emergency access to emergency personnel in situations such as a fire. Emergency personal may remove or loosen the threaded screws 58, thus decreasing or eliminating the clamping force between the lock system 10 and the door 22. After the clamping force is decreased or eliminated, a user may slide the u-brackets 16 outward from the interior bracket 12 and the exterior bracket 14. When slid outward relative to the interior bracket 12 and exterior bracket 14 the u-brackets 16 disengage the brackets 12 and 14, thus eliminating any clamping force, clamping action, or engagement between the interior bracket 12 and the door 22. Once the interior bracket 12 is disengaged from the door emergency personnel may then open the door without an impediment caused by the lock pin 18 engaging the floor pin hole 62.

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Optionally, a lock or lock pin removal tool 176, such as illustrated in FIG. 12, is configured to assist emergency personnel in removing the lock system 10 when the lock system 10 is installed on a door 22 that swings in toward the lock pin 18, wherein the look system 10 would impede the door 22 from opening unless the lock pin 18 is disengaged from the floor. The lock removal tool includes a main shaft 178 and at least one leg 180 perpendicularly fixed to the main shaft 178. Preferably, the lock removal tool 176 is formed from a single elongated piece of material with a perpendicular bend between the main shaft 178 and the at least one leg 180. As illustrated in FIGS. 13A and 13C, after sliding the u-brackets 16 outward, an emergency personnel 182, from the exterior of the door, inserts the lock removal tool 176 between the door 22 and the floor toward the lock pin 18 on the interior of the door 22. Once the leg 180 is clear of the interior face of the door 22, the emergency personnel 182 turns the main shaft 178 to lift the leg 180, as such lifting the interior bracket 12 and lock pin 18 out of the floor. As illustrated in FIGS. 13B and 13D, the lock removal tool 176 is inserted under the door until the leg 180 is clear of the interior face of the door, the emergency personnel 182 turns the main shaft 178, wherein the leg 180 lifts the interior bracket 12 and the lock pin 18 out of the floor, allowing the door 22 to open inward.

In one embodiment, a plurality of holes 65 are disposed in flange plates 26, 36, and 40 to accept and secure an interior concealing beauty cover 66 and an exterior concealing beauty cover (not shown) (FIGS. 8-10). The interior cover 66 and exterior cover are configured to provide a deterrent to vandalism and tampering with the lock system 10 and as an aesthetic covering over the interior bracket 12 and the exterior bracket 14. The exterior cover may be removed by emergency response personnel during emergencies, such as a fire, to access the threaded screws 58 in order to remove the lock system 10 from the door 22. The interior cover 66 includes a hole 160 on both the top side 162 and the bottom side 164 of the beauty cover 66 to allow the lock pin 18 to pass through the beauty cover 66, through the lock pin holes 30 on the flange plates 26 and into the floor or the floor pin hole 62. Optionally, the interior cover 66 includes a guide sleeve 166 disposed on the interior of the body of the interior beauty cover 66 to guide the lock pin 18 between the lock pin holes 30 as the operator is inserting the lock pin 18 into the door lock system 10.

In one embodiment, an alarm system 200 is disposed in proximity with the lock system 10 wherein the lock pin 18 is removably supported by a housing 202 of the alarm system 200, and the alarm system 200 is configured to emit an alert from the interior side of the door 22 if the pin 18 is removed from the alarm system 200. (FIGS. 14 and 20) The housing 202 is mounted on a wall on the interior side of the door 22 in proximity to the lock system 200. The alarm system 200 may include a pressure sensitive switch 201 that is toggled during insertion and removal of the lock pin 18 from the housing 202, such that when the pin 18 is inserted in the housing 202, the switch 201 is toggled off and the alarm 200 is deactivated (FIG. 21). When the pin 18 is removed from the housing 202, the switch 201 is toggled on and the alarm 200 is activated. The alert from the alarm system 200 may be an audible alert from a speaker 204, a visual alert from a light source, or a combination of audible and visual alerts. As will be appreciated, the alert of alarm system 200 provides a deterrent from students or others from tampering with or taking the lock pin 18 when there is no emergency situation. A lock pin 18 coupled to an alarm system 200 at every door having a lock system 10 installed

allows any individual to secure the door in an emergency situation, instead of only those who may be carrying a lock pin 18 on their person. The alarm system 200 is configured to operate on replaceable battery power. Optionally, the alarm system 200 is hardwired into the building electricity supply for power.

Optionally, the alarm system 200 utilizes a commercially available alarm system activated by the removal of a pin, a key, a chain, or the like, wherein the lock pin 18 is coupled to the pin of the commercially available alarm system. Commercially available examples of alarm systems that are suitable for alarm system 200 include the SABRE PA-01, PA-NBCF-01, or PA-RAINN-01 Personal Alarms.

In another embodiment, as illustrated in FIGS. 15-16, 18-19B, and 22-24, an alarm system 210 is disposed in proximity with the lock system 10 wherein the lock pin 18 is removably supported by an interior housing 211 of the alarm system 210, and the alarm system 210 is configured to create an alert from an exterior housing 213 if the pin 18 is removed from the alarm system 210. (FIGS. 15-16). The alarm system 210 may include a pressure sensitive switch 201 that is toggled during insertion and removal of the lock pin 18 from the interior housing 211, such that when the pin 18 is inserted in the interior housing 211, the switch 201 is toggled off and the alarm 210 is deactivated (FIG. 24). When the pin 18 is removed from the interior housing 211, the switch 201 is toggled on and the alarm 210 is activated. The interior housing 211 is mounted on a wall on the interior side of the door 22 and the exterior housing 213 is mounted on a wall on the exterior side of the door 22 in proximity to the lock system 210. The components disposed on the interior housing 211 are in communication with the components disposed on the exterior housing 213 by a wire 215 passing through the wall. (FIGS. 18-19B) The alert from the alarm system 210 may be an audible alert from a speaker 212, visual alert from a light source 214, or a combination of audible and visual alerts, wherein the speaker 212, the light 214, or both, are disposed on the exterior housing 213. Preferably, the alert from the alarm system 210 is programmable to disarm after a specified time of operation, such that emergency personnel are not exposed to extended periods of loud noises or bright lights, or such that an adequate amount of time has passed to ensure that emergency personnel are alerted by the alert (see FIG. 24A).

Optionally, the alarm system 210 utilizes a commercially available alarm system activated by the removal of a pin, a key, a chain, or the like, wherein the lock pin 18 is coupled to the pin of the commercially available alarm system which is disposed on the interior housing 211. Commercially available examples of alarm systems that are suitable for alarm system 210 include the SABRE PA-01, PA-NBCF-01, or PA-RAINN-01 Personal Alarms.

As will be appreciated, the alert of alarm system 210 provides useful benefits including a deterrent from students or others from tampering with or taking the lock pin 18, alerting emergency personnel of a potential emergency event, a possible location of an emergency event, alerting emergency personnel if the room is secured, and additional benefits. A lock pin 18 coupled to an alarm system 210 at every door having a lock system 10 installed allows any individual to secure the door in an emergency situation, instead of only those who may be carrying a lock pin 18 on their person. The alarm system 210 is configured to operate on replaceable battery power. The alarm system 210 may be hardwired into the building electricity supply for power. Optionally, the alarm system 210 includes an actuation key 217 configured to arm or disarm the alarm system 210.

In the illustrated embodiment of FIGS. 15-17, 23A, and 23B, alarm system 210 includes an additional alert light 216 configured to alert emergency personnel of the exact room or location where an emergency situation is occurring. The additional alert light 216 is disposed on the exterior housing 213 and is configured to be manually operated by a button or switch 218 disposed on the interior housing 211 by an operator on the interior side of the door 22 (FIGS. 16 and 22). Optionally, the additional alert light 216 is only operable using the button 218 if the lock pin 18 has been removed from the interior housing 211.

In yet another embodiment, as illustrated in FIG. 17, alarm system 210 includes an audibly activated sensor or sonar sensor, not shown, configured to detect specific audible signals in response to an audible event, such as a specific decibel range of a gun firing, such that the audible event activates the alert of the alarm system 210. The audibly activated system automatically activates the alerts of the alarm system 210 whether or not the lock pin 18 has been removed from the interior housing 211. Optionally, the alarm system 210 including the audibly activated sensor further includes a transponder configured to send a signal to a control system to provide location information to the control system based on the alarm system 210 nearest in proximity to the audible event.

In one embodiment, a method 310 for securing a door during an emergency event includes closing 312 a door 22, the door 22 having an emergency door lock system 10 removably mounted on the door 22, inserting 314 a lock pin 18 into a lock pin hole 30 on a portion of the emergency door lock system 10 on the interior side of the door 22 after the door 22 has been closed, the lock pin 18 engaging the emergency door lock system 10 mounted on the door 22 and engaging a remote pin slot 62 remotely spaced adjacent the emergency door lock system 10 mounted on the door 22. The lock pin 18 remains in place until the emergency situation has been resolved. At such time, the method 310 includes removing 316 the lock pin 18 to allow the door 22 to be opened.

In one aspect, the method for securing a door during an emergency event 310 further includes disassembling 318 the emergency door lock 10 from an exterior side of the door 22 if emergency access to the room is required, including removing 320 an exterior cover, removing 322 a plurality of mechanical fasteners 58 from an exterior bracket 14, if necessary, removing 324 the exterior bracket 14, and sliding 326 u-brackets 16 apart from each other and away from the interior bracket 12. If the emergency door lock system 10 is mounted on an out-swinging door, the door 22 can then be opened to gain access to the room. If the emergency door lock system 10 is mounted on an in-swinging door, the method 310 includes removing 328 the lock pin 18 from the exterior of the door 22 from underneath the door 22 with a lock pin removal tool 176. Once the lock pin 18 has been removed, the in-swinging door can be opened to access the room.

Accordingly, the emergency door lock system provides a simple system for securing a door, including inswing and outswing doors, during a lock down situation, for instance during an active shooter situation. An interior bracket on the interior of a door and an exterior bracket on the exterior of the door are disposed between a set of u-shaped brackets. The u-shaped brackets include a set of set-screws that are tightened to produce a pressure of the exterior bracket and thus create a clamping force between the interior bracket and the exterior bracket to secure the lock system onto the door. The interior bracket includes a set of lock pin holes for

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accepting and engaging a lock pin. Optionally, a floor plate or sleeve is disposed on the floor below the interior bracket with a floor pin hole located directly below the lock pin holes of the interior bracket such that the lock pin can be entered into the interior bracket and through the floor plate to secure the door in a closed orientation. Engagement of the lock pin through the lock pin holes and floor pin hole provides a substantial deterrent to the unwanted entry through a door during an emergency situation. Optionally, the lock pin is removably coupled to an alarm system in proximity to the door lock system, such that the lock pin is always in proximity to the lock system and that individuals are deterred from tampering with or removing the lock pin in non-emergency situations. The alarm system is configurable to alert emergency personnel of an ongoing emergency situation or the specific location of a current or resolved emergency situation.

Changes and modifications in the specifically described embodiments can be carried out without departing from the principles of the present invention, which is intended to be limited only by the scope of the appended claims, as interpreted according to the principles of patent law, including the doctrine of equivalents.

The embodiments of the invention in which an exclusive property is claimed are defined as follows:

1. An emergency door lock system, comprising:

an insertable lock pin;
an interior clamp bracket;
an exterior clamp bracket; and
a plurality of u-brackets;

wherein said interior clamp bracket is configured to contact against an interior of a door, said exterior clamp bracket is configured to contact against an exterior of the door, and said plurality of u-brackets support, secure, and provide a clamping force to said interior and exterior clamp bracket to secure the door lock system on the door, wherein the clamping force is provided by a plurality of threaded fasteners disposed in a plurality of threaded holes through at least one portion of said u-brackets;

wherein said interior clamp bracket further comprises a bracket pin slot configured to accept said lock pin and allow said lock pin to pass through said bracket pin slot; wherein said lock pin is configured to engage said interior clamp bracket through said bracket pin slot and simultaneously engage a remote pin slot to secure the door in a closed position, said remote pin slot remotely spaced adjacent to said interior clamp bracket;

wherein said plurality of u-brackets are removably fastened to said exterior clamp bracket such that said door lock system is disassembleable and removable from the door for emergency removal.

2. The emergency door lock system of claim 1, wherein said u-brackets are removably fastened to said exterior clamp bracket by at least some of said plurality of threaded fasteners comprising a plurality of threaded screws.

3. The emergency door lock system of claim 1, wherein said lock pin comprises an elongate rod having a uniform cross section.

4. The emergency door lock system of claim 3, wherein a grip is disposed at one end of said lock pin.

5. The emergency door lock system of claim 1, wherein said interior clamp bracket is defined by a steel plate having an upper flange and a lower flange disposed on opposing edges of said plate, said flanges each including a vertical pin hole such that said pin holes define said bracket pin slot.

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6. The emergency door lock system of claim 1, wherein said exterior clamp bracket is defined by a steel plate having an upper flange and a lower flange disposed on opposing edges of said plate.

7. The emergency door lock system of claim 2, wherein said exterior clamp bracket comprises a plurality of holes defined through said clamp bracket substantially corresponding in location to said threaded holes in said u-brackets when said u-brackets are mated to said exterior bracket, each of said plurality of holes configured to allow a threaded fastener to pass through said exterior clamp bracket and contact the door to secure said lock system to the door.

8. The emergency door lock system of claim 7, wherein when said threaded fasteners contact the door, a tip of said threaded fastener indents the door, such that said threaded fastener protrudes at least partially into the dimension of the door defined by the exterior face of the door.

9. The emergency door lock system of claim 1, further comprising an interior bracket cover and an exterior bracket cover, wherein said interior cover is removably attached to said interior clamp bracket such that said interior clamp bracket is substantially covered by said interior cover and allowing said lock pin to pass through said interior cover and said bracket pin slot, wherein said exterior cover is removably attached to said exterior clamp bracket such that said exterior clamp bracket is substantially covered by said exterior cover.

10. The emergency door lock system of claim 9, wherein said interior cover further comprises a guide sleeve disposed on an interior of the body of said interior cover to guide said lock pin between said vertical pin holes disposed in said upper and lower flanges of said interior bracket as the operator inserts said lock pin into said door lock system.

11. The emergency door lock system of claim 1, further comprising a floor plate disposed on a floor below said interior clamp bracket, said floor plate containing a floor lock pin hole having a center that is substantially coaxial with the center of said bracket pin slot when the door is in a closed position, said floor lock pin hole defining said remote pin slot such that said lock pin is capable of engaging a resilient and robust remote engagement point.

12. The emergency door lock system of claim 1, further comprising a lock pin floor sleeve disposed on a floor below said interior clamp bracket, said floor sleeve containing a floor lock pin hole having a center that is substantially coaxial with the center of said bracket pin slot when the door is in a closed position, said floor lock pin hole defining said remote pin slot such that said lock pin is capable of engaging a resilient and robust remote engagement point.

13. The emergency door lock system of claim 1, further comprising an alarm system removably coupled to said lock pin such that when said lock pin is removed from said alarm system, said alarm system emits an alert.

14. The emergency door lock system of claim 13, wherein said alert is one of an audible alert, a visual alert, and a combination audible and visual alert.

15. The emergency door lock system of claim 13, wherein said alert is projected to one of an area on an interior side of the door and an area on an exterior side of the door.

16. An emergency door lock system, comprising:

an insertable lock pin comprising an elongate rod having a generally uniform cross section along an operative region thereof;

an interior clamp bracket;
an exterior clamp bracket; and
a plurality of u-brackets;

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wherein said interior clamp bracket is configured to contact against an interior of a door, said exterior clamp bracket is configured to contact against an exterior of the door, and said plurality of u-brackets support, secure, and provide a clamping force to said interior and exterior clamp bracket to secure the door lock system on the door, wherein the clamping force is provided by a plurality of threaded fasteners disposed in a plurality of threaded holes through at least one portion of said u-brackets;

wherein said u-brackets are removably fastened to said exterior clamp bracket by at least some of said plurality of threaded fasteners comprising a plurality of threaded screws;

wherein said interior clamp bracket is defined by a steel plate having an upper and a lower flange disposed on opposing edges of said plate, said flanges each including a vertical pin hole;

wherein said exterior clamp bracket is defined by a steel plate having an upper and a lower flange disposed on opposing edges of said plate;

wherein said vertical pin holes disposed through said upper and lower flanges of said interior clamp define a bracket pin slot configured to accept said lock pin and allow said lock pin to pass through said bracket pin slot;

wherein said lock pin is configured to engage said interior clamp bracket through said bracket pin slot and simultaneously engage a remote pin slot to secure the door in a closed position;

wherein said lock pin is portable;

wherein said plurality of u-brackets are removably fastened to said exterior clamp bracket such that said door lock system is disassembleable and removable from the door for emergency removal.

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17. The emergency door lock system of claim 16, further comprising an interior bracket cover and an exterior bracket cover, wherein said interior cover is removably attached to said interior clamp bracket such that said interior clamp bracket is substantially covered by said interior cover and allowing said lock pin to pass through said interior cover and said bracket pin slot, wherein said exterior cover is removably attached to said exterior clamp bracket such that said exterior clamp bracket is substantially covered by said exterior cover.

18. A method for securing a door, said method comprising:

- closing a door if it is open, the door having an emergency door lock system removeably mounted proximate an edge portion of the door;
- inserting a lock pin into a lock pin hole on a portion of the emergency door lock system on an interior side of the door after the door has been closed, the lock pin engaging the emergency door lock system mounted on the door and engaging a remote pin slot remotely spaced adjacent the emergency door lock system when the door is closed; and
- if emergency entry is required through the closed door, removing the emergency door lock system from an exterior side of the door including removing an exterior cover from the emergency door lock system, removing a plurality of mechanical fasteners from an exterior bracket of the emergency door lock system, sliding a plurality of u-brackets of the emergency door lock system away from each other, and opening the door outward if the door is an out-swinging door, and if the door is an in-swinging door, removing the lock pin of the emergency door lock system with a lock removal tool and opening the door inward.

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