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(54) **REUSABLE BREACHING TRAINING DOOR**

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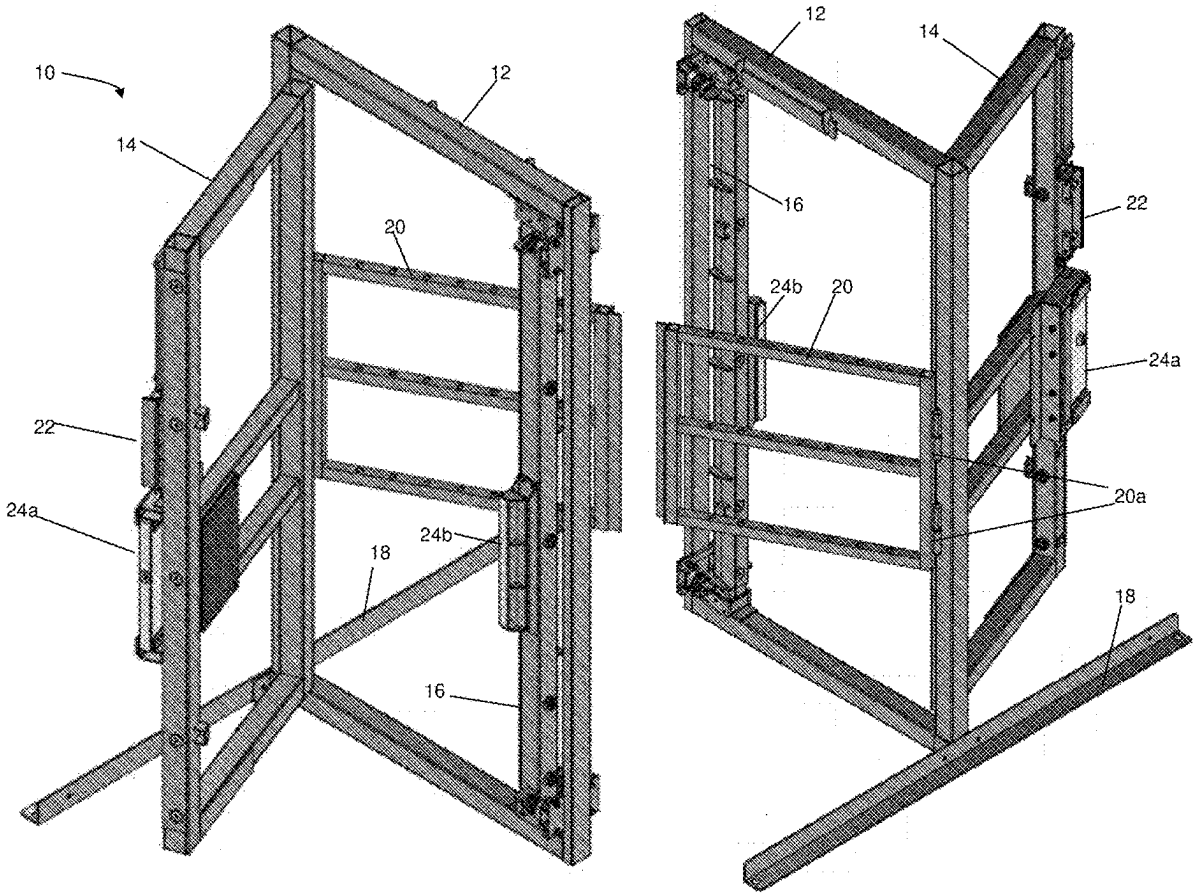
(57) **ABSTRACT**

Presented herein is a training apparatus designed for training first responders, law enforcement and military personal in the use of breaching tools. The training apparatus comprises: a door and a door frame. The door frame comprises an additional upright profile that functions as the door jamb located between a lock side upright of the door frame and a lock side rail of the door. The door jamb is supported by the door frame but not fixed directly to it at either the top or the bottom of the door jamb, thereby allowing the door jamb to move away from a lock side rail of the door during a breaching exercise. Also described herein are several add-on training assemblies that provide different realistic training scenarios.



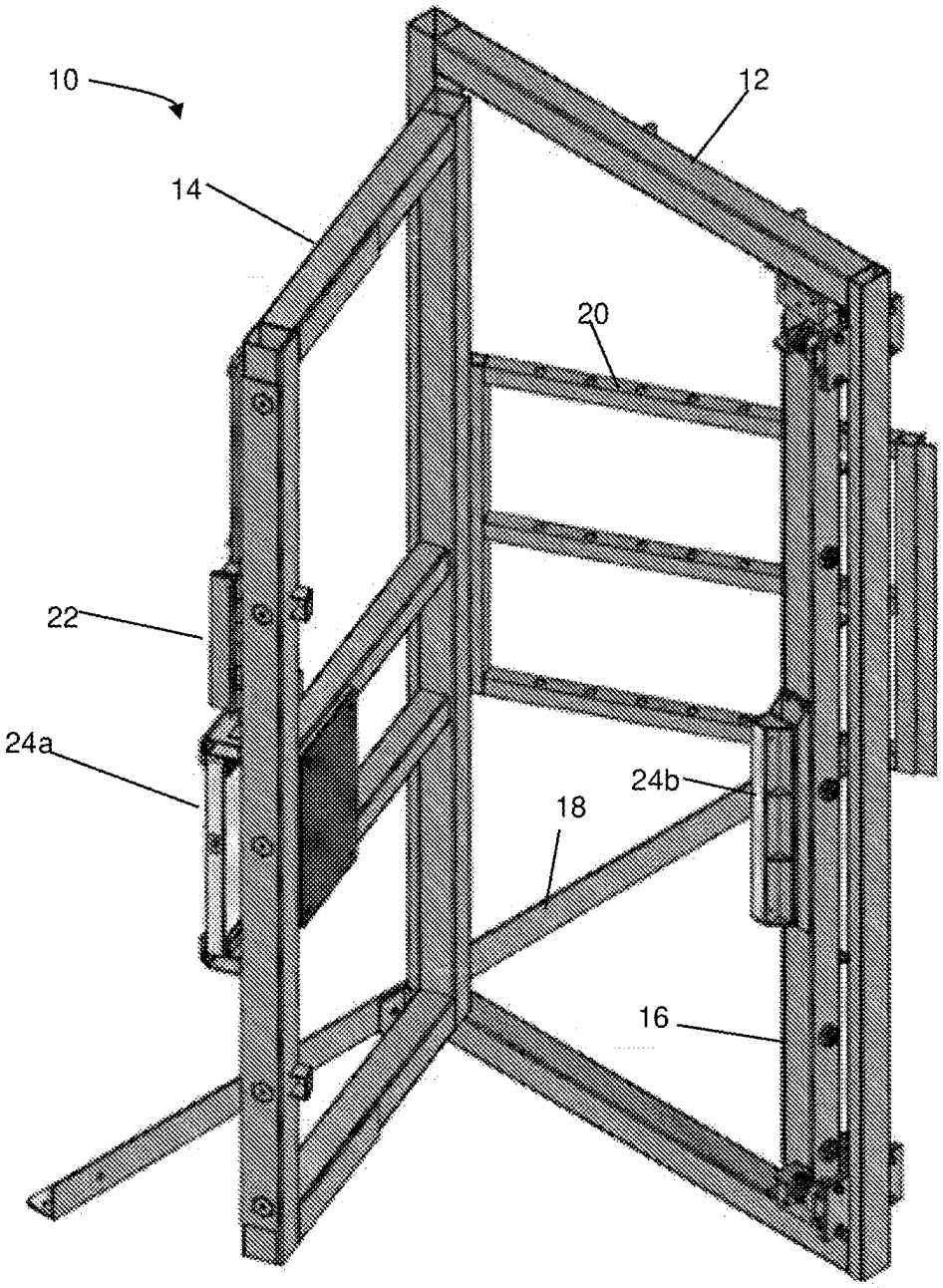


Fig. 1A

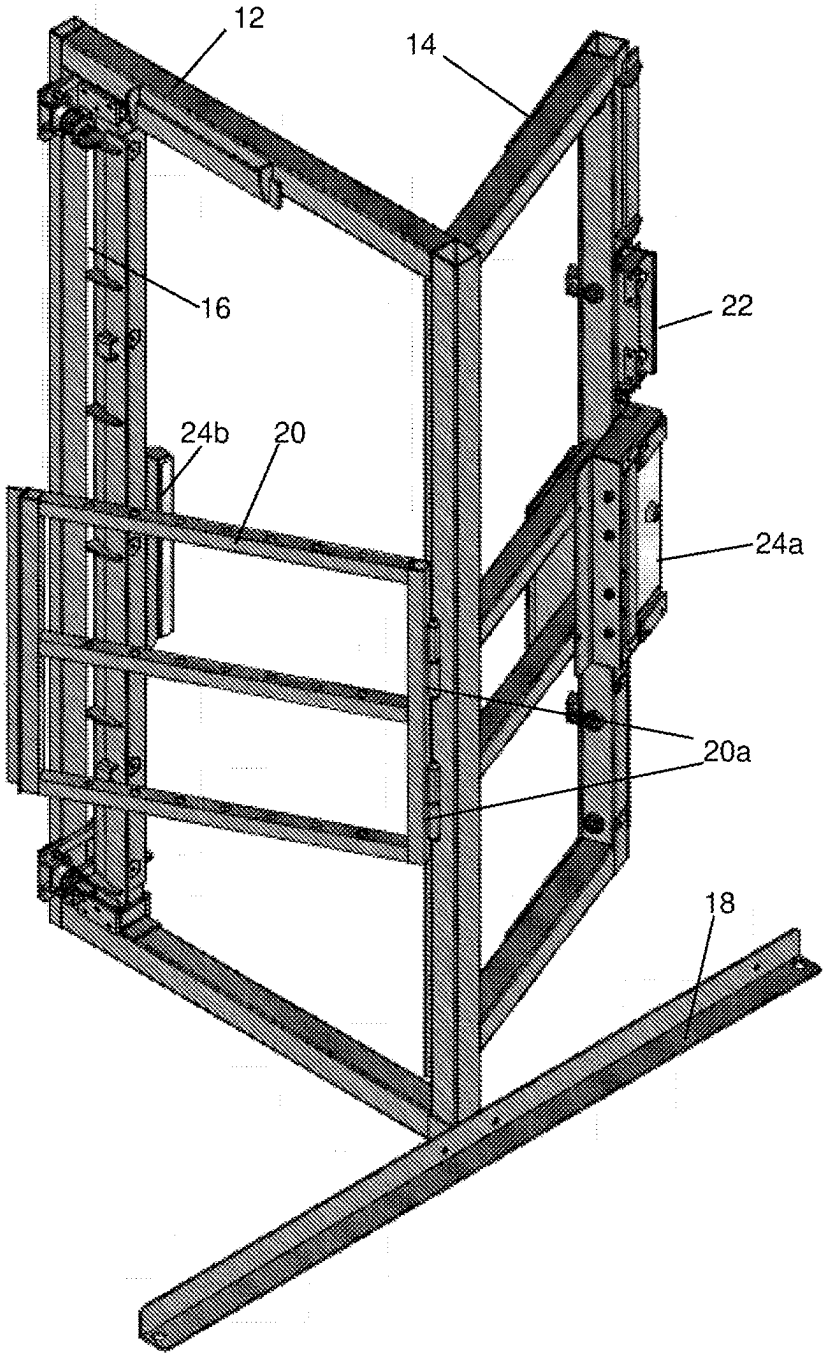


Fig. 1B

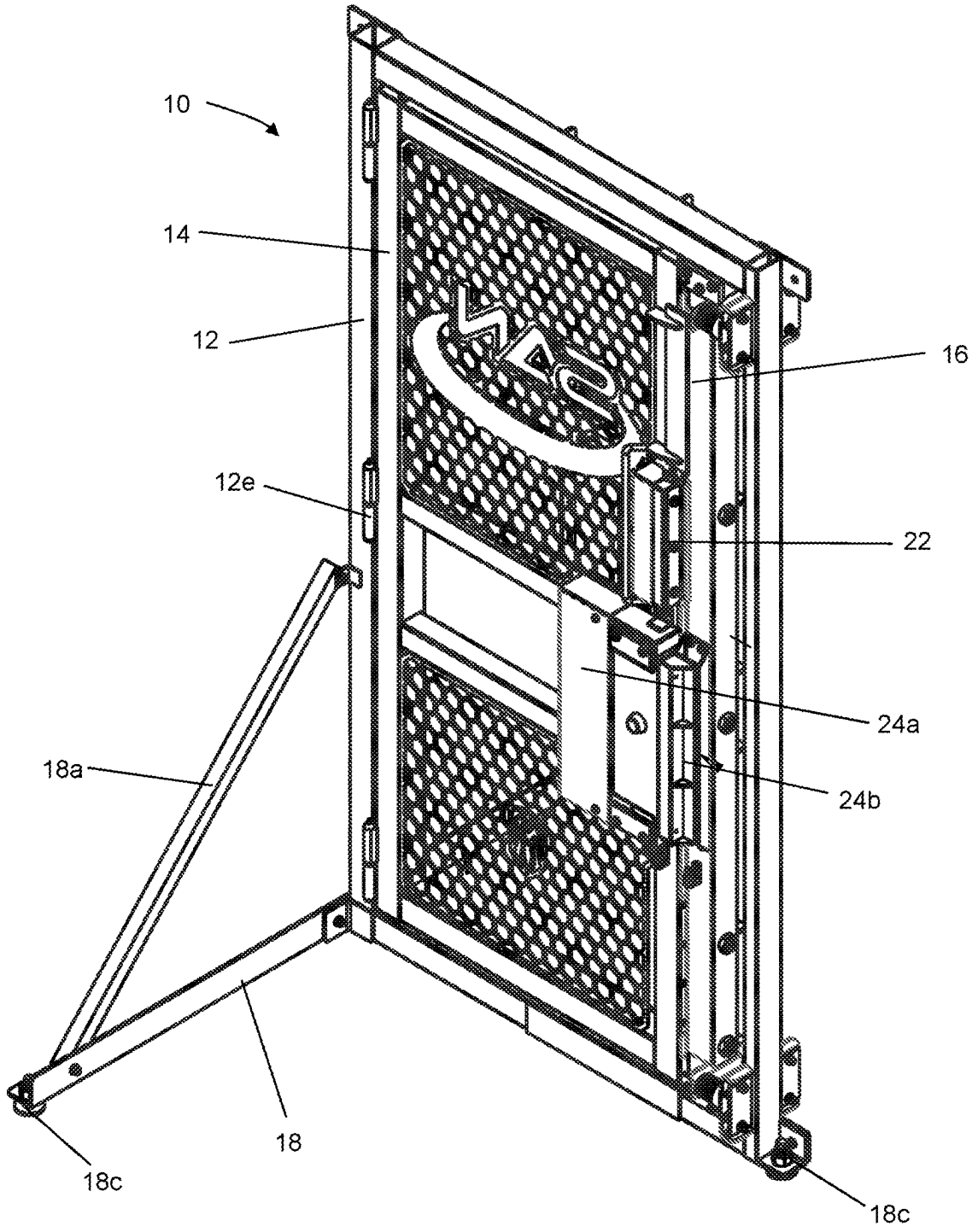


Fig. 1C

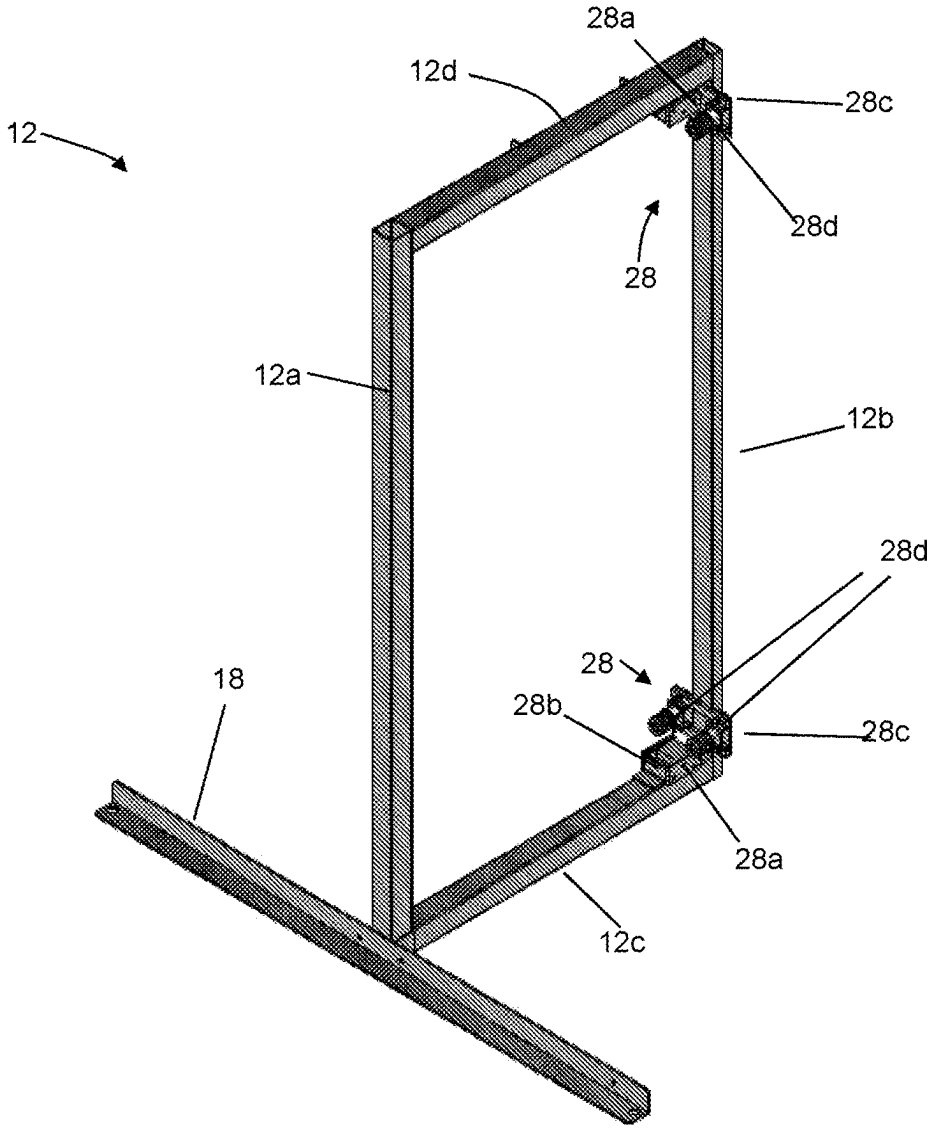


Fig. 2A

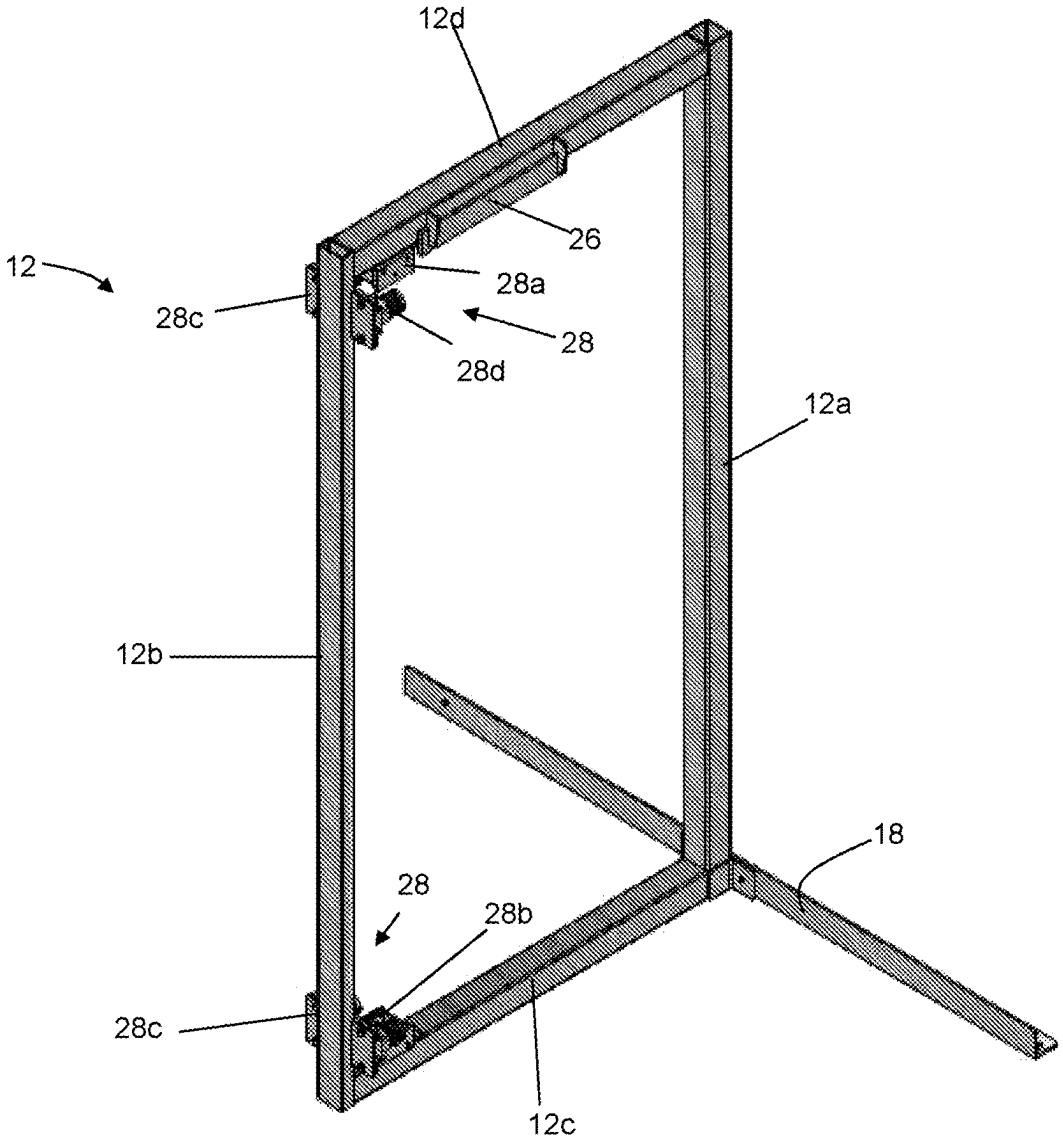


Fig. 2B

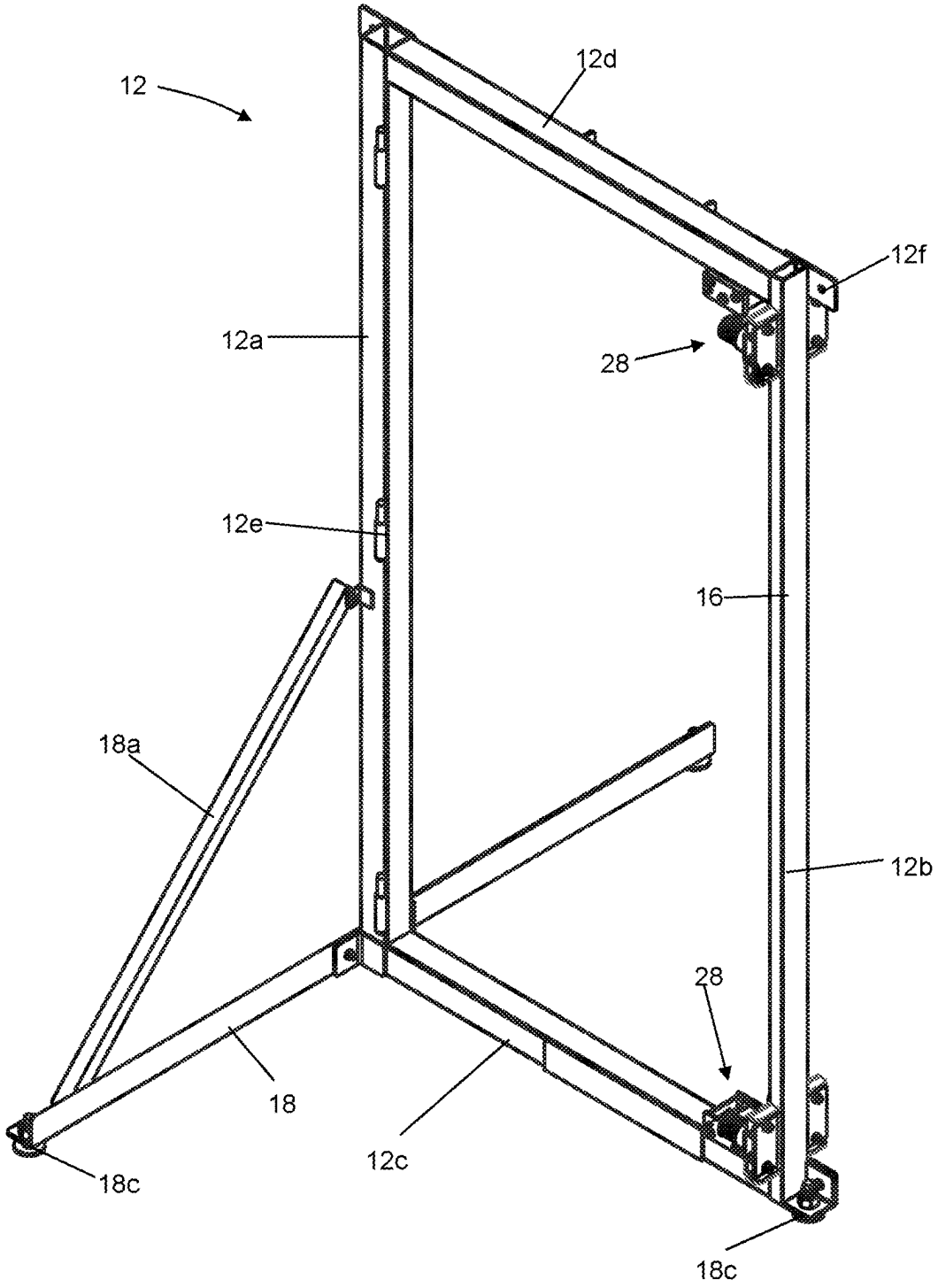


Fig. 2C

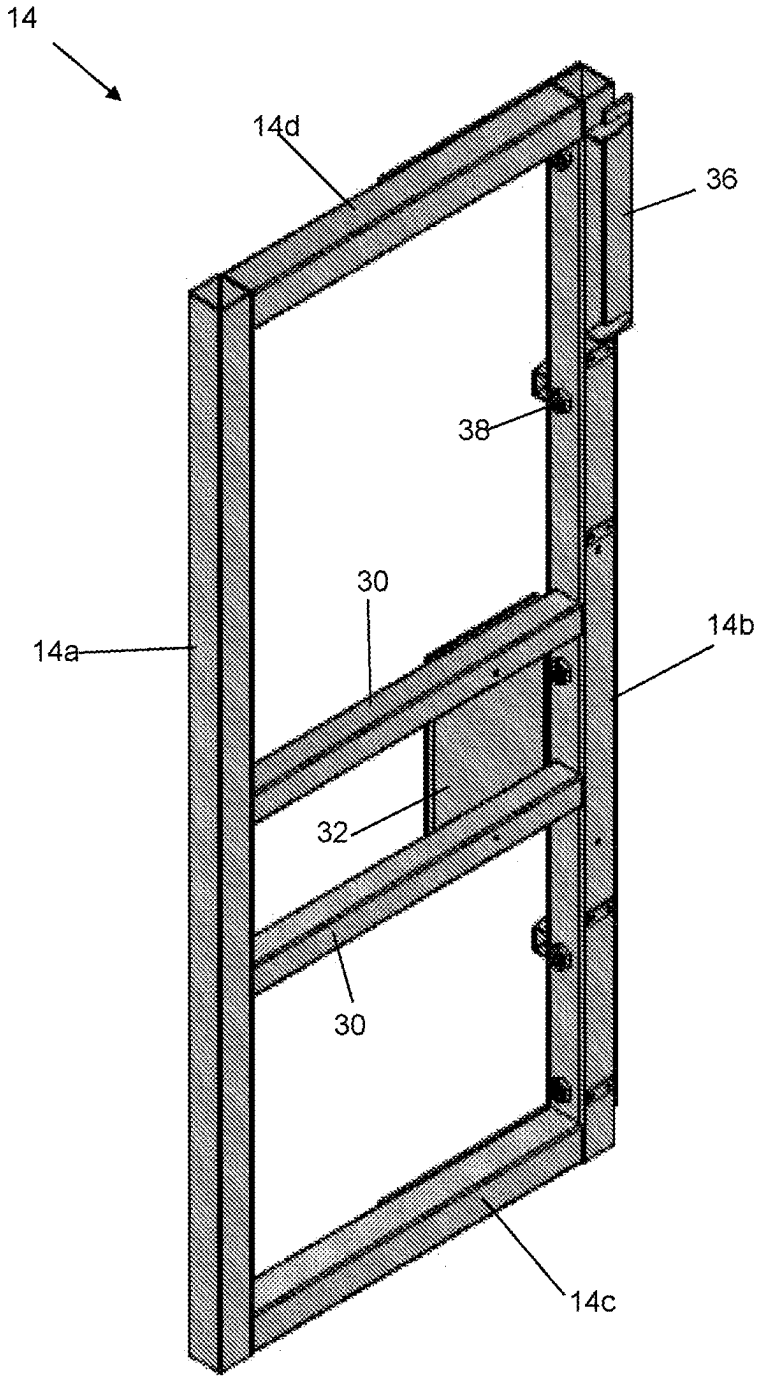


Fig. 3A

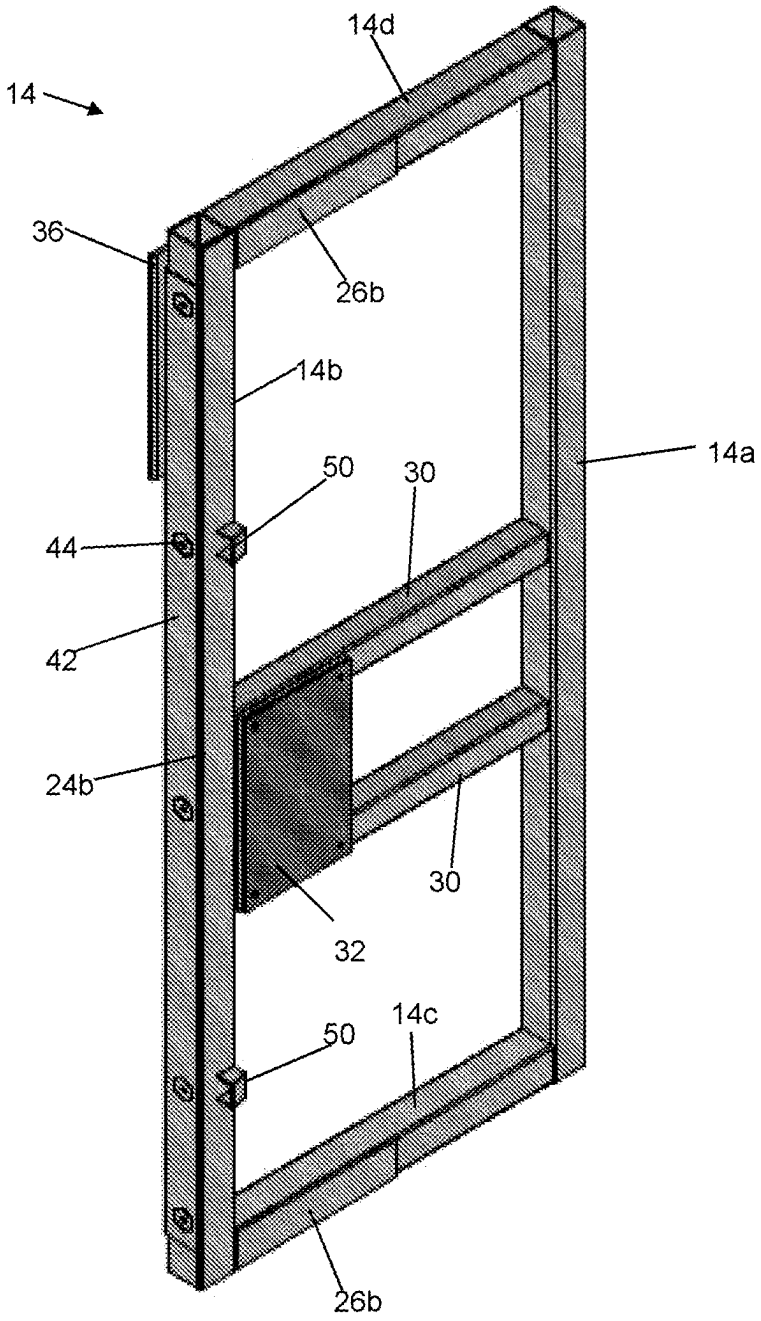
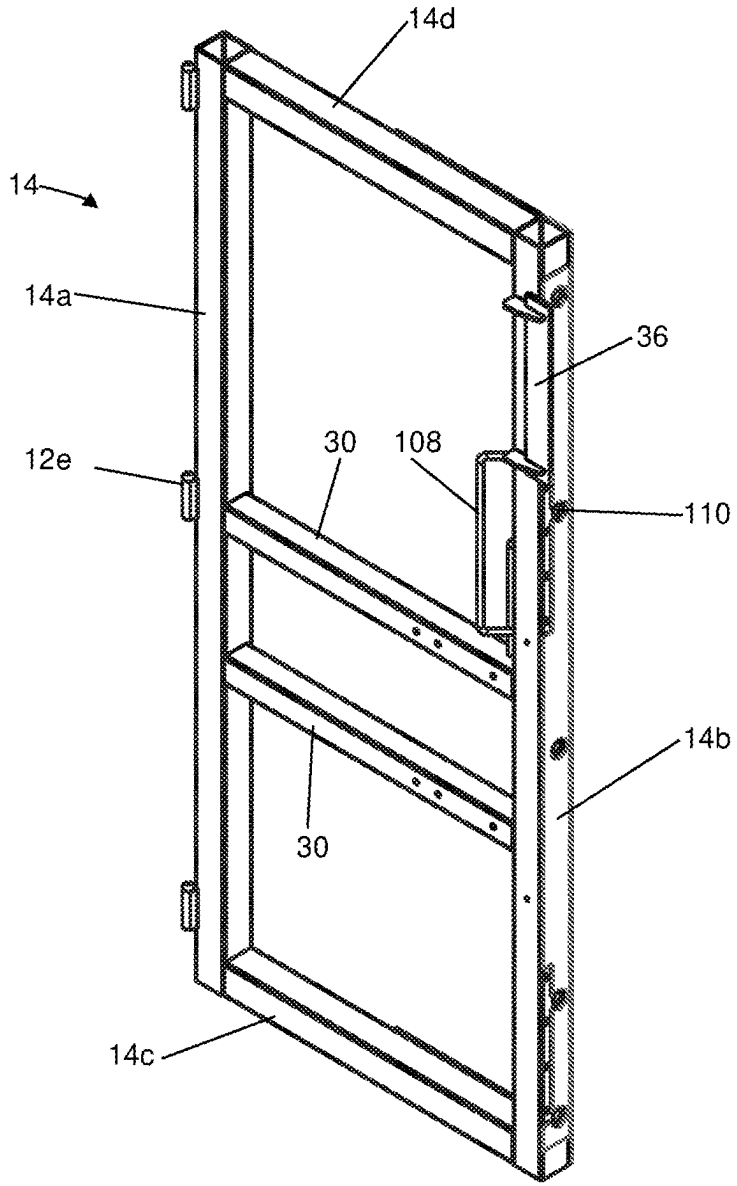


Fig. 3B



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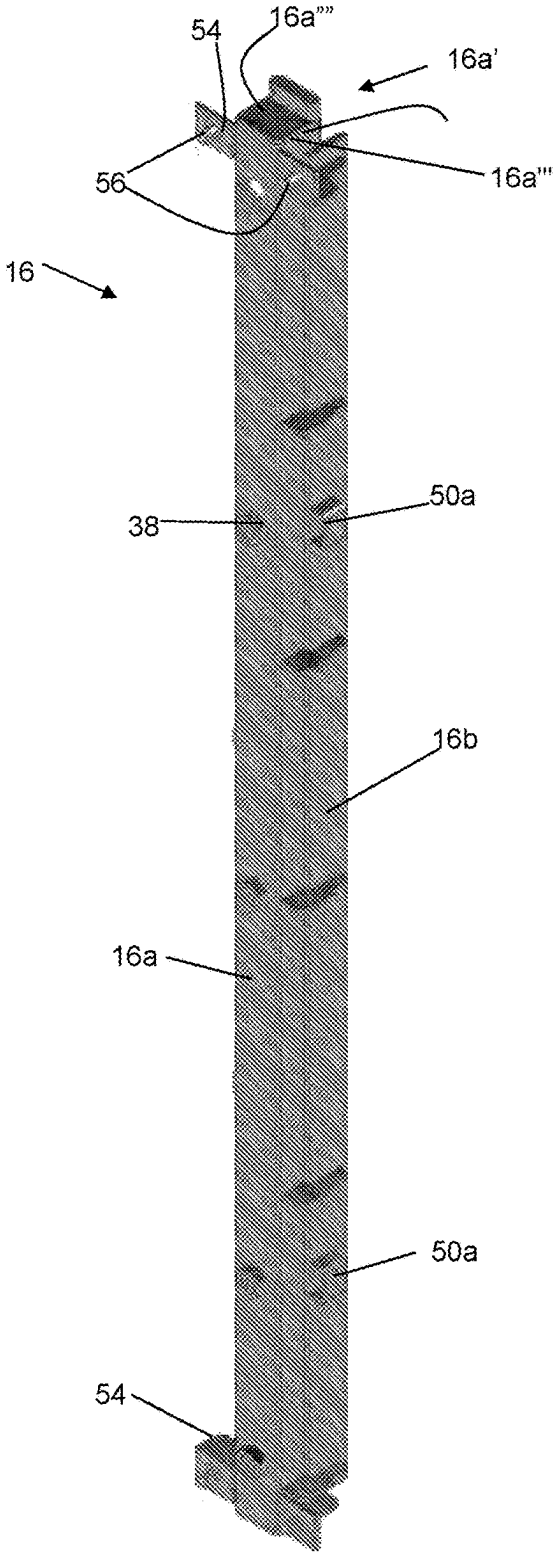
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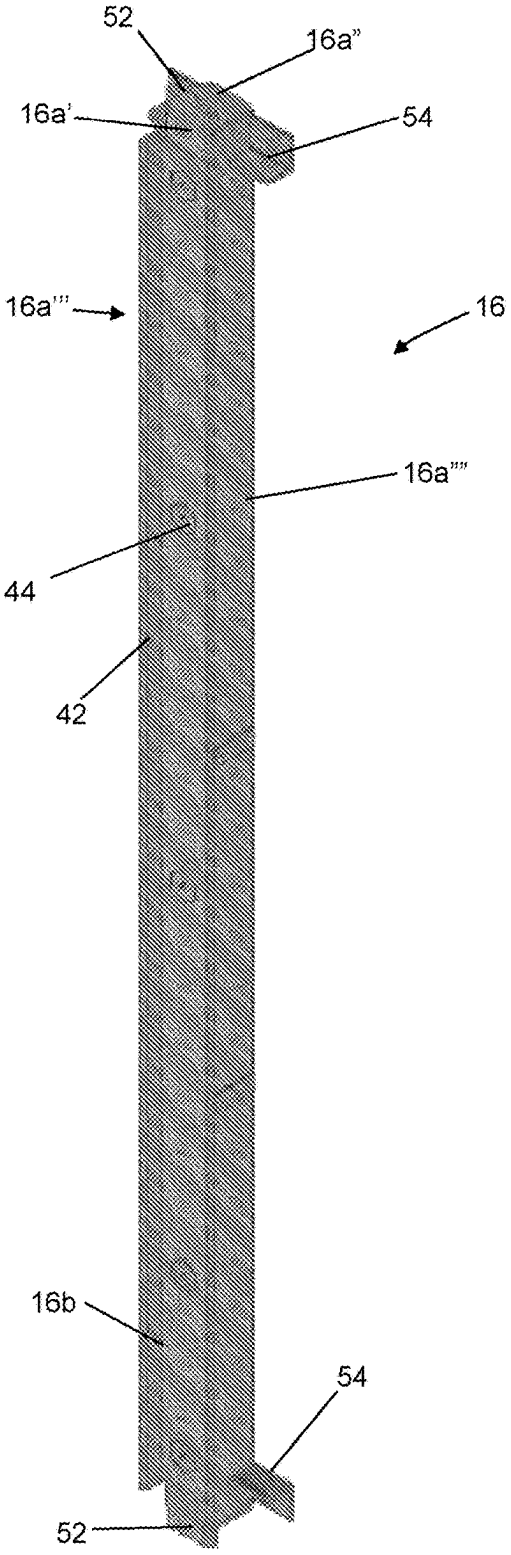
16a""
16a'
56
16a'''
16
38
50a
16b
16a
50a
54

Fig. 4A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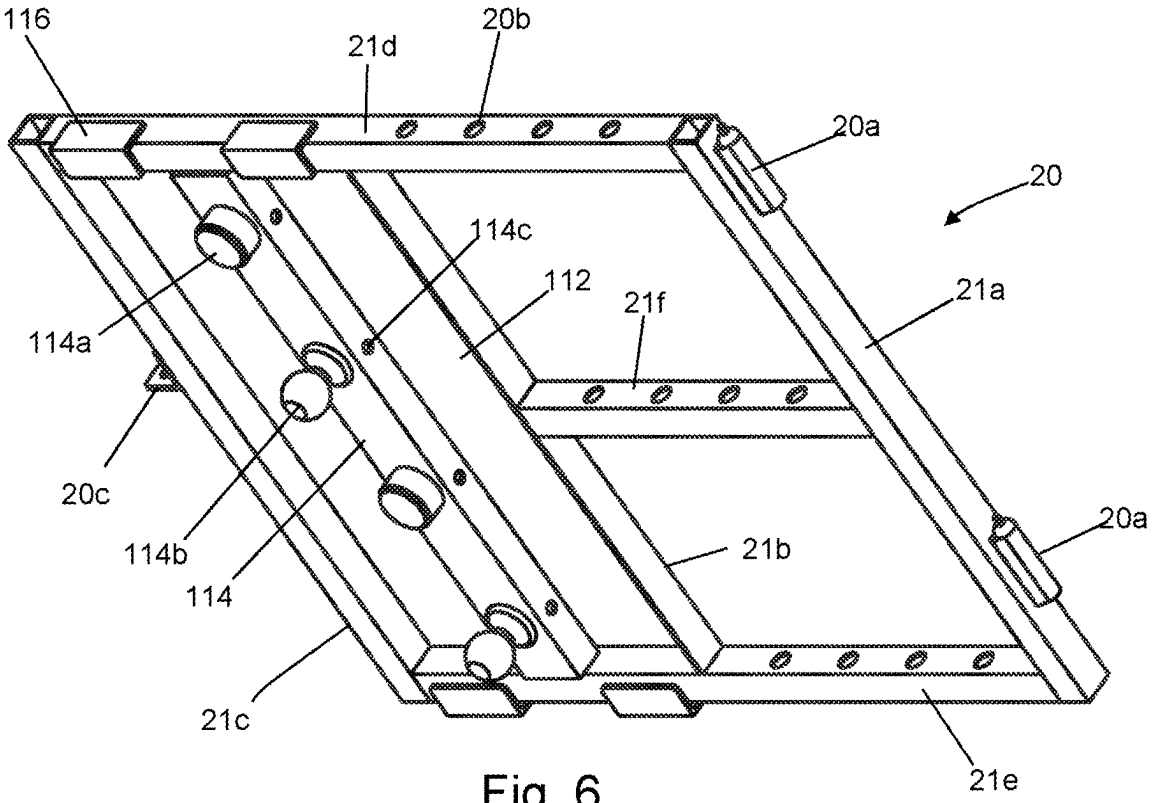
16a""
44
42
16b
54
52

Fig. 4B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114c
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21f
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114
21b
20a
21c
21e

Fig. 6

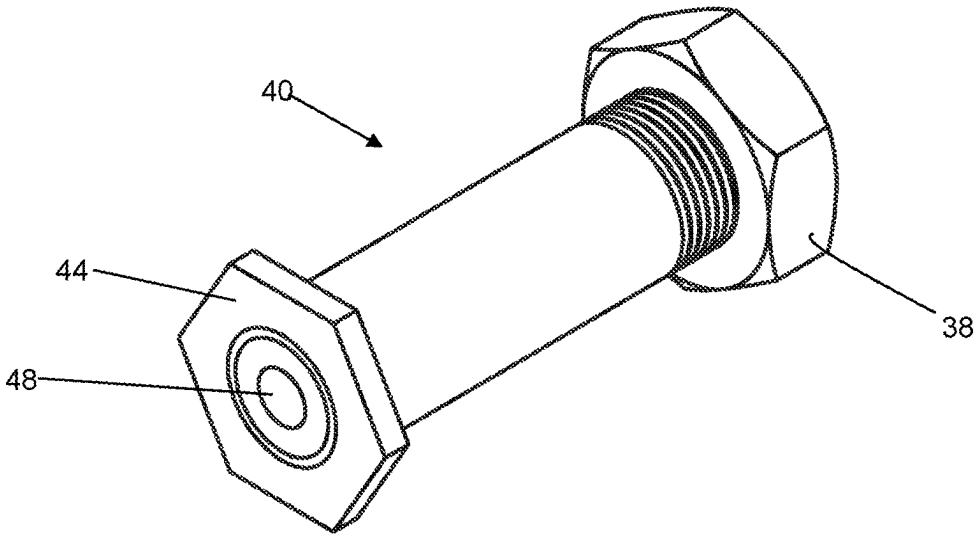
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Fig. 5

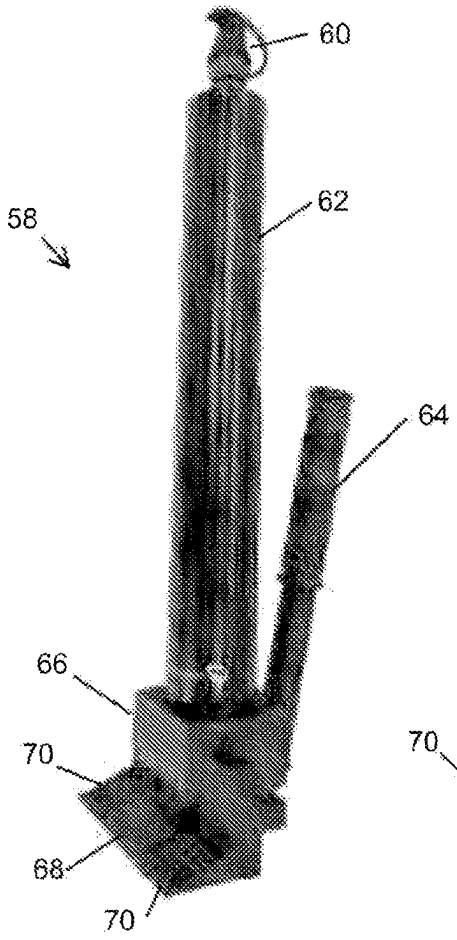

Fig. 7A

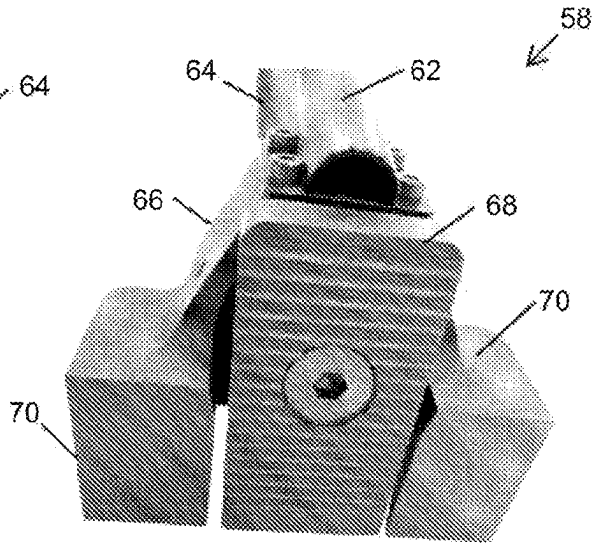

Fig. 7B

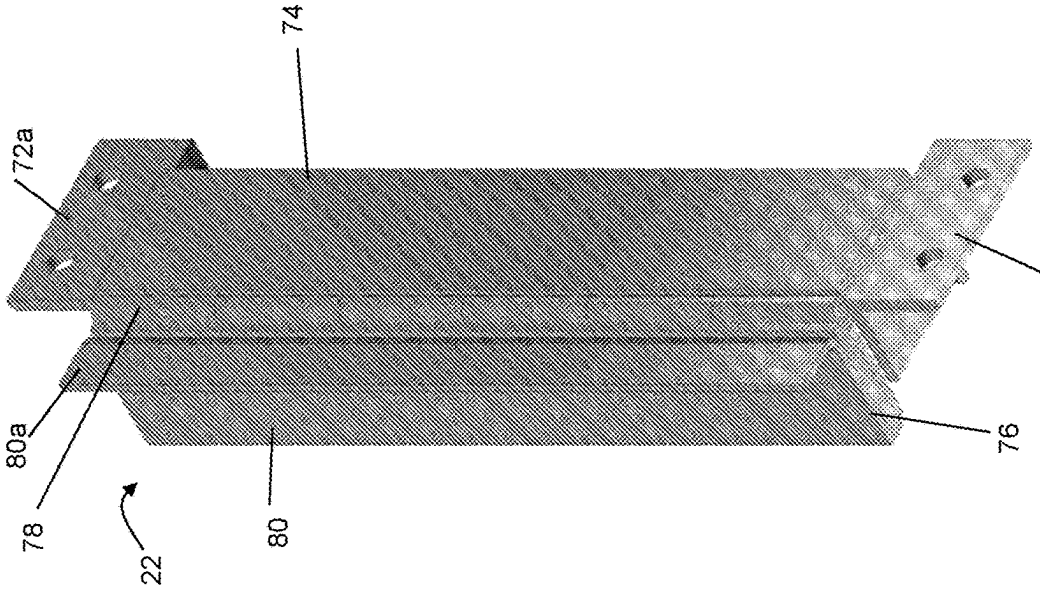

Fig. 8B

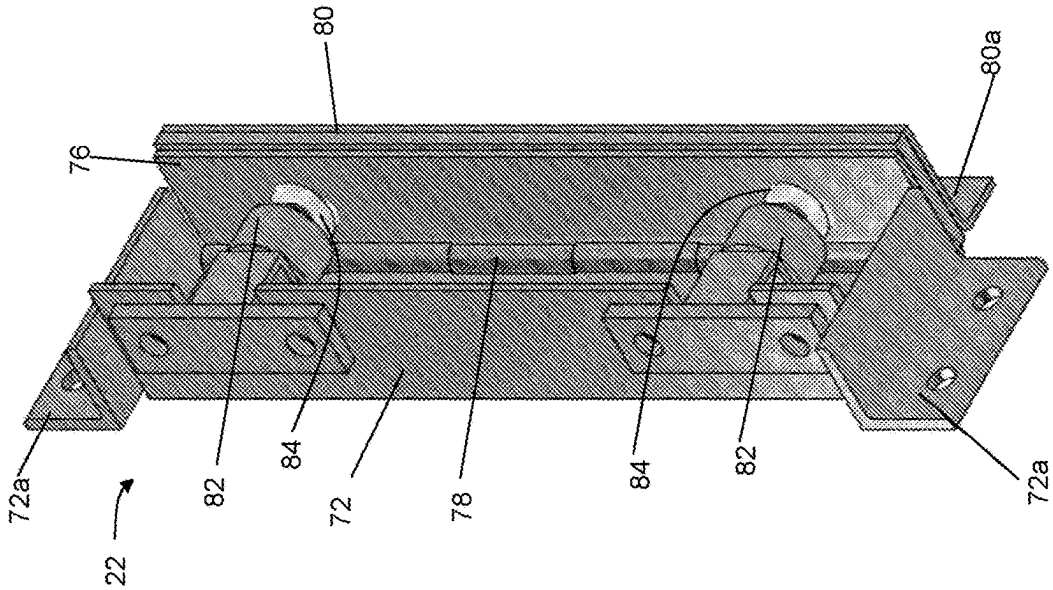

Fig. 8A

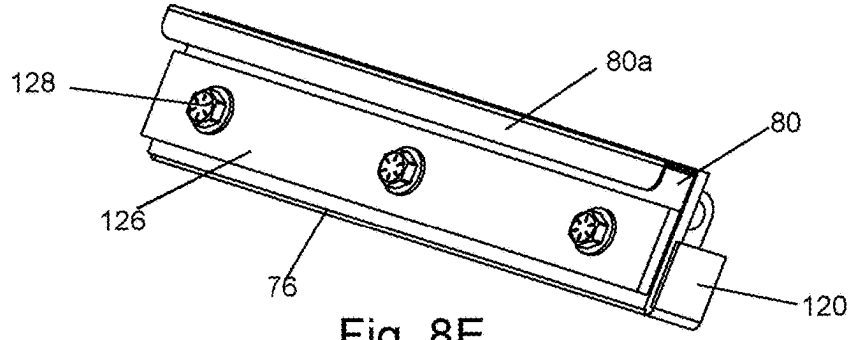

Fig. 8E

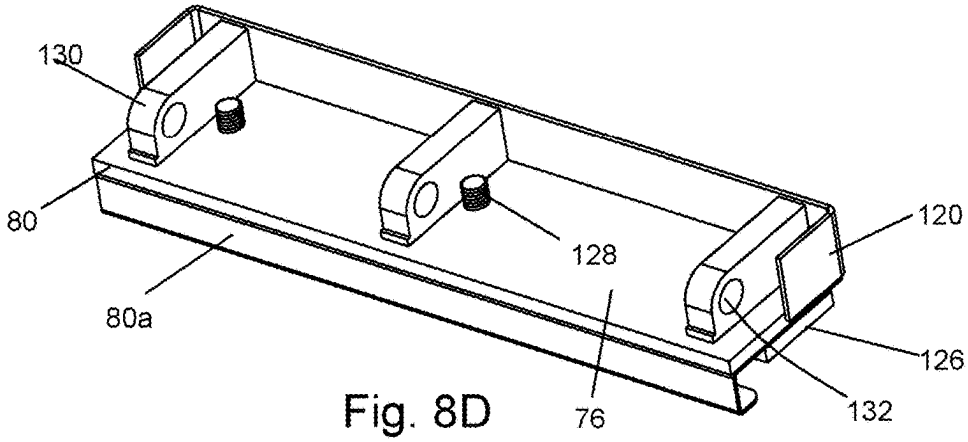

Fig. 8D

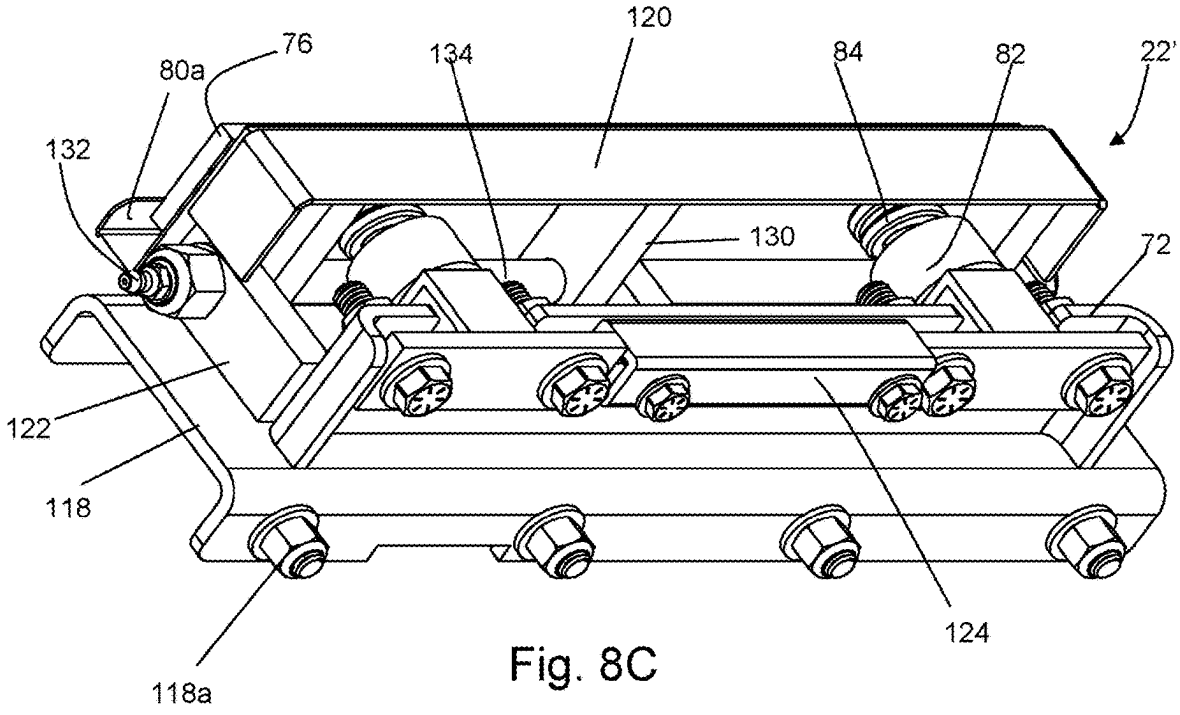

Fig. 8C

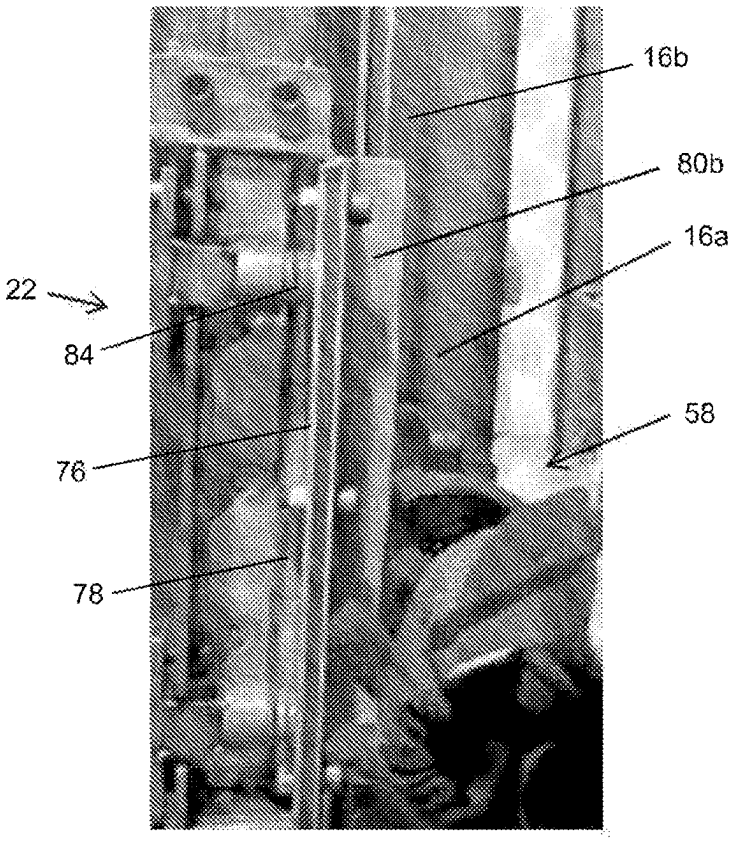

Fig.9B

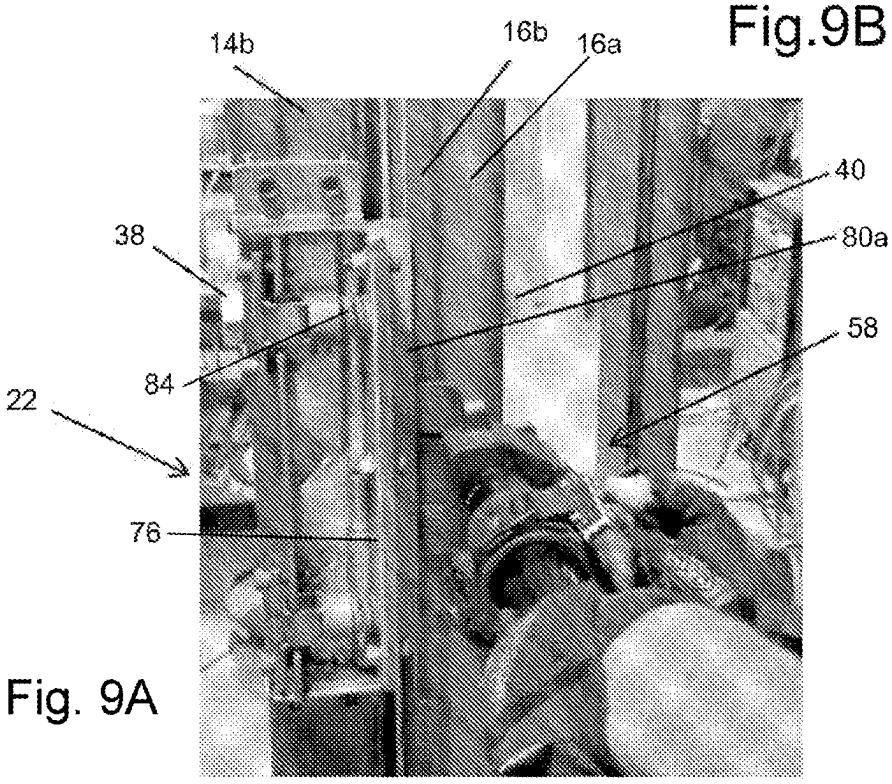

Fig. 9A

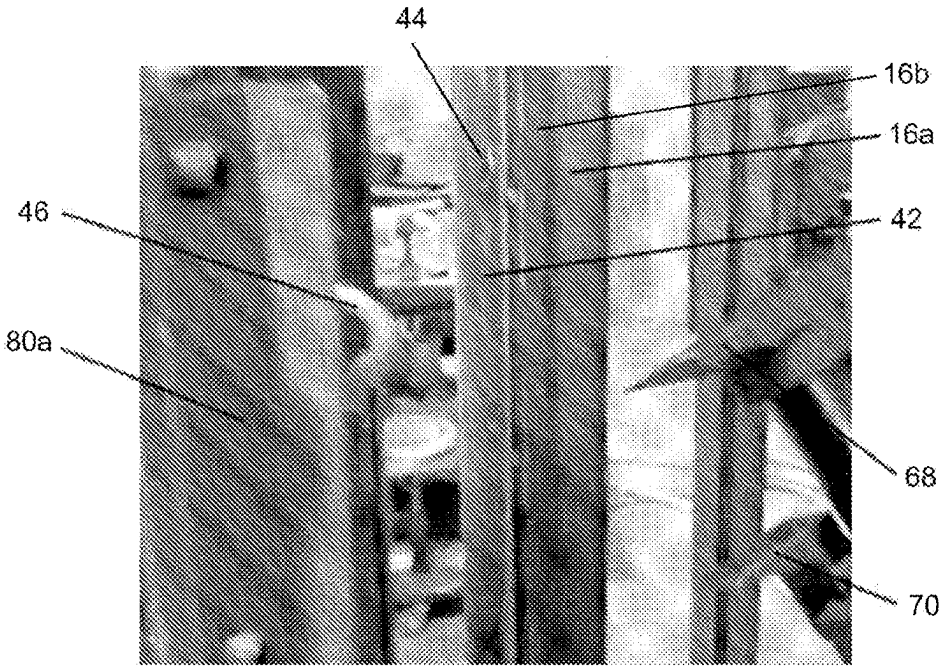

Fig. 9D

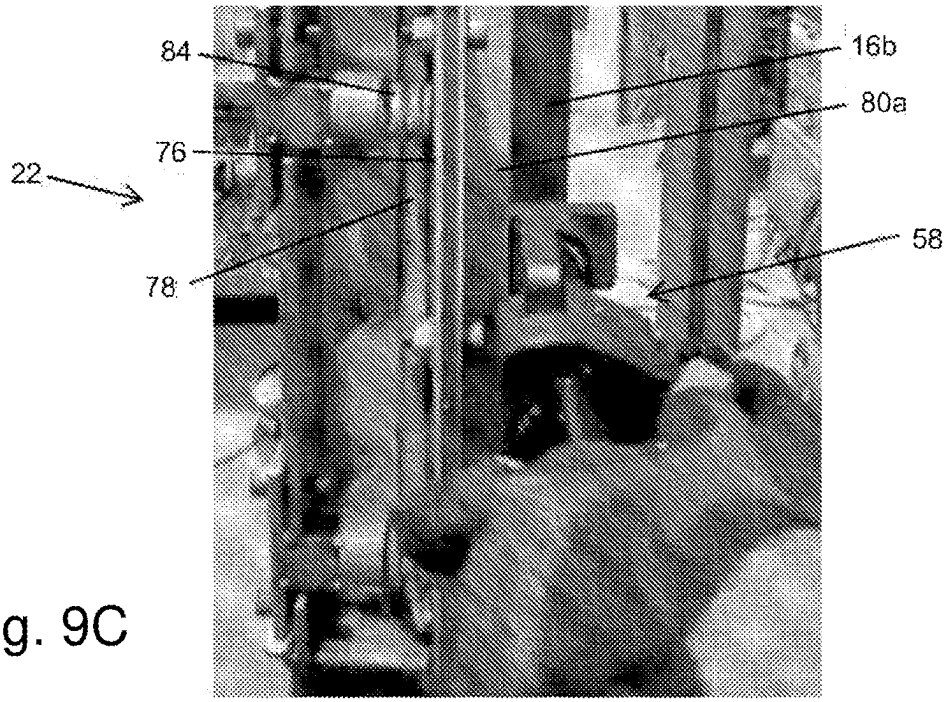

Fig. 9C

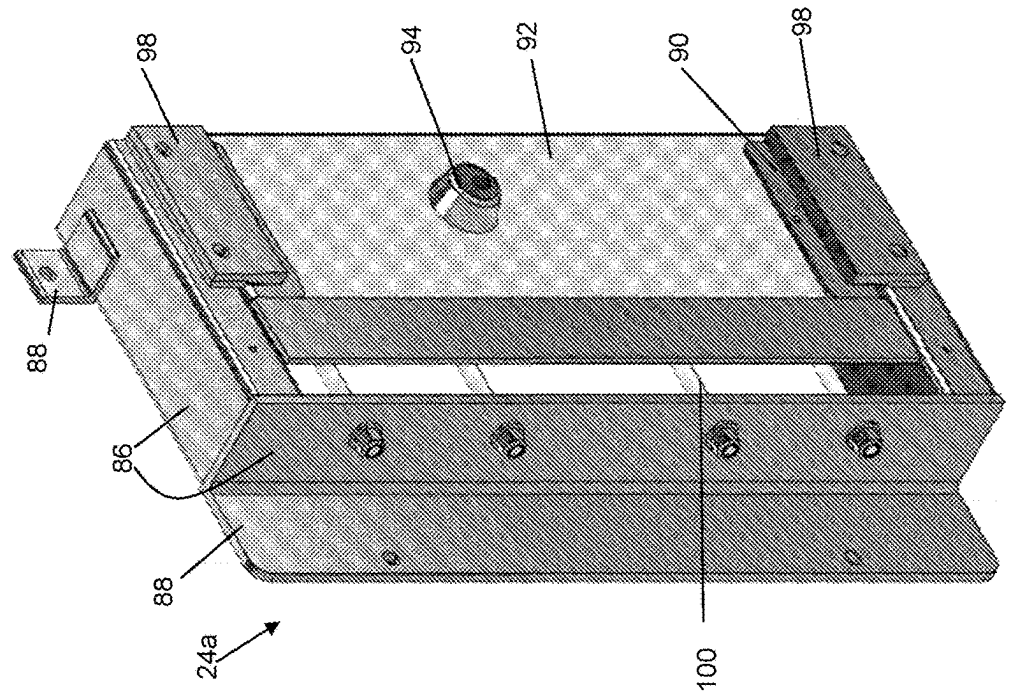

Fig. 10A

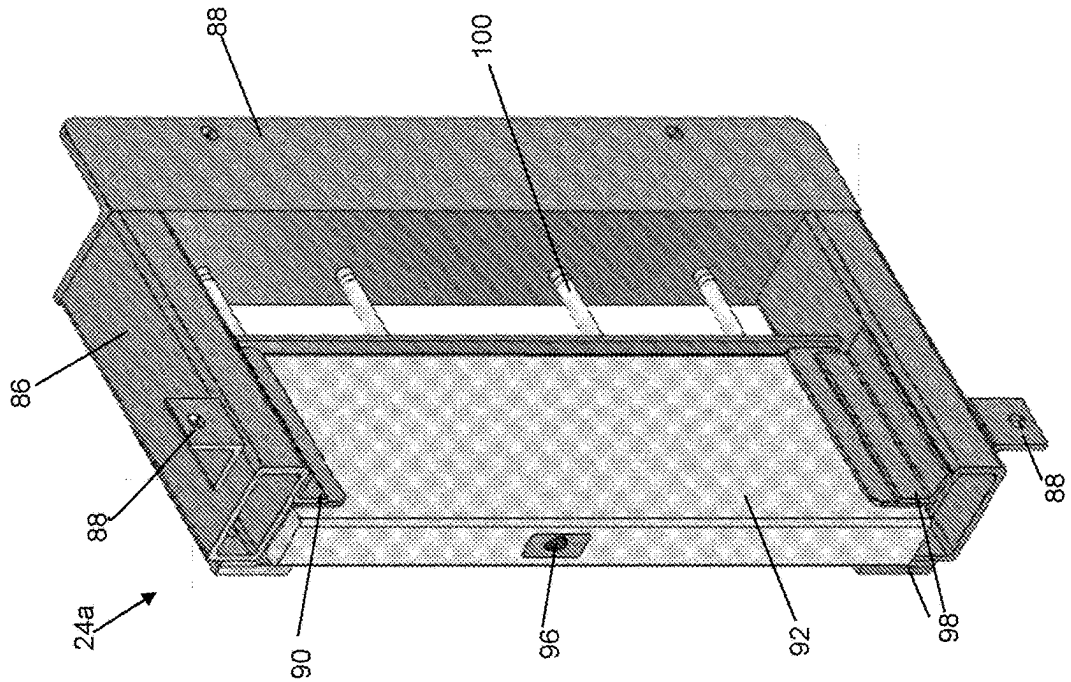

Fig. 10B

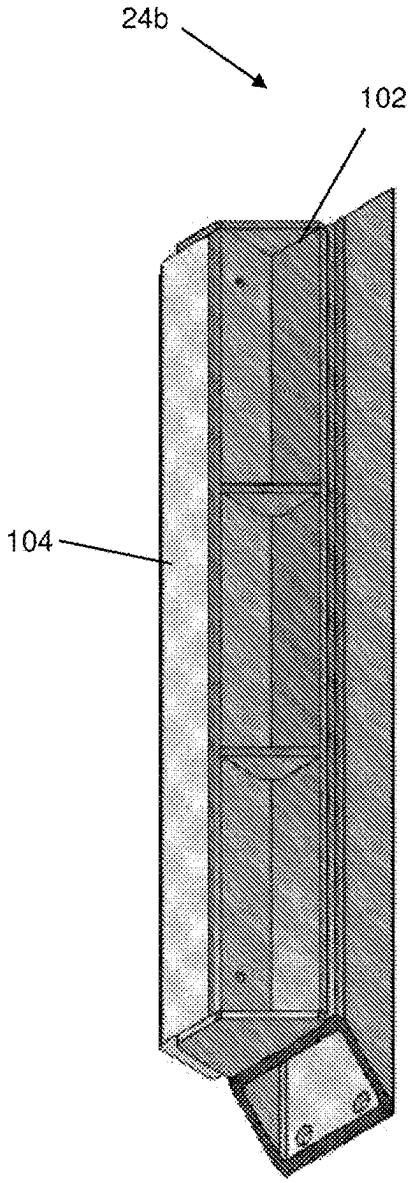

Fig. 11A

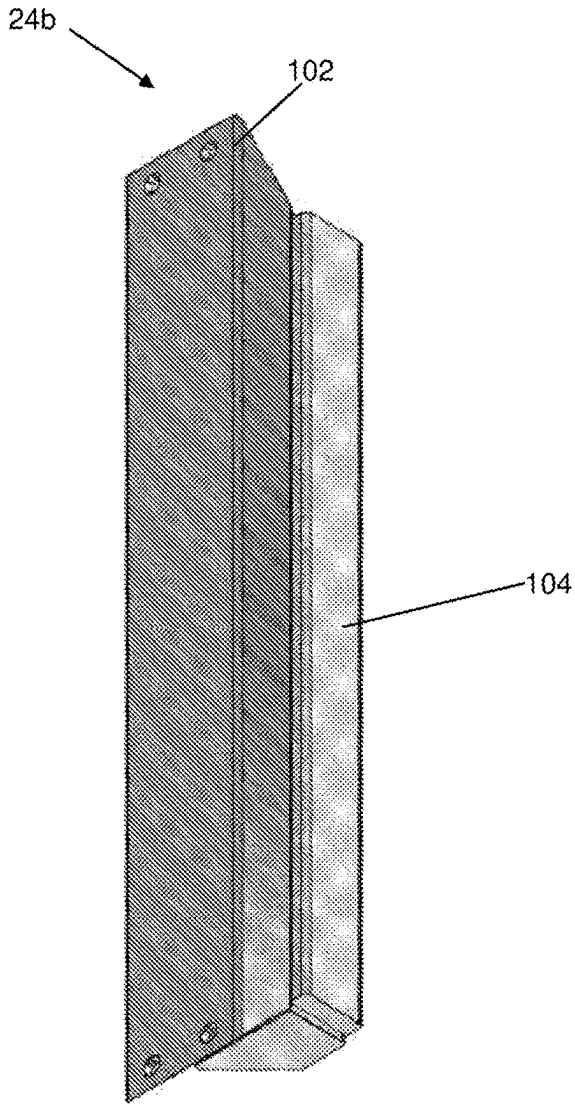

Fig. 11B

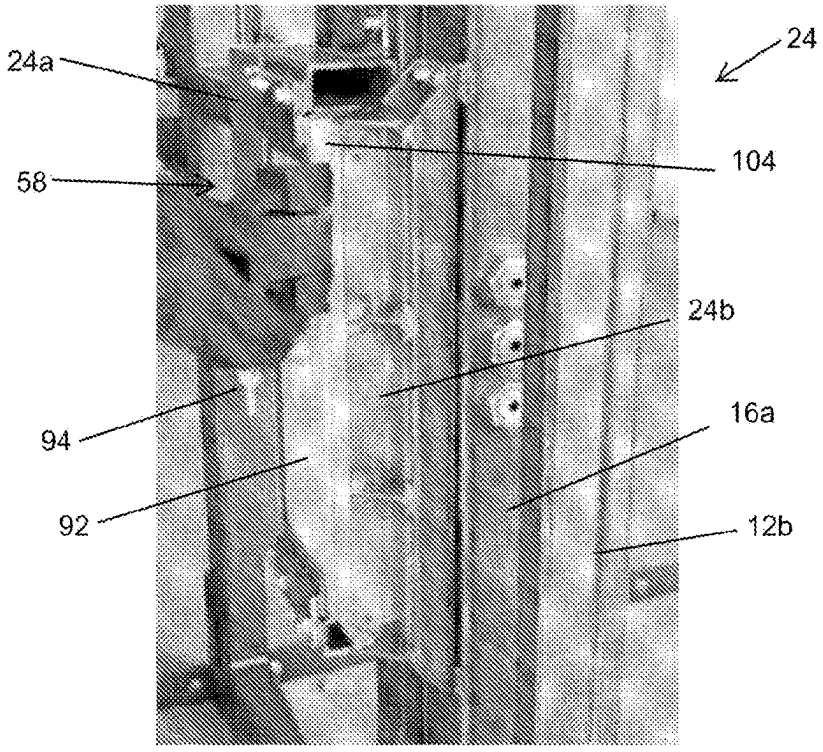

Fig. 12A

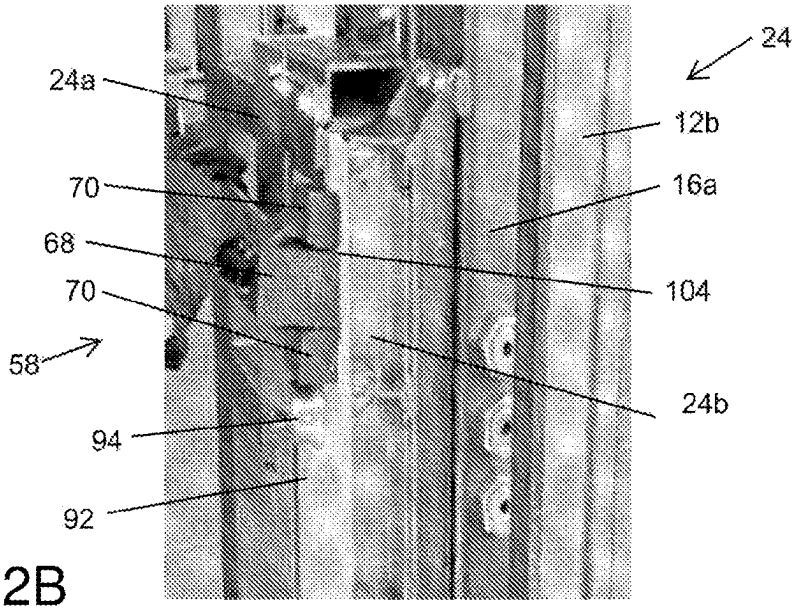

Fig. 12B

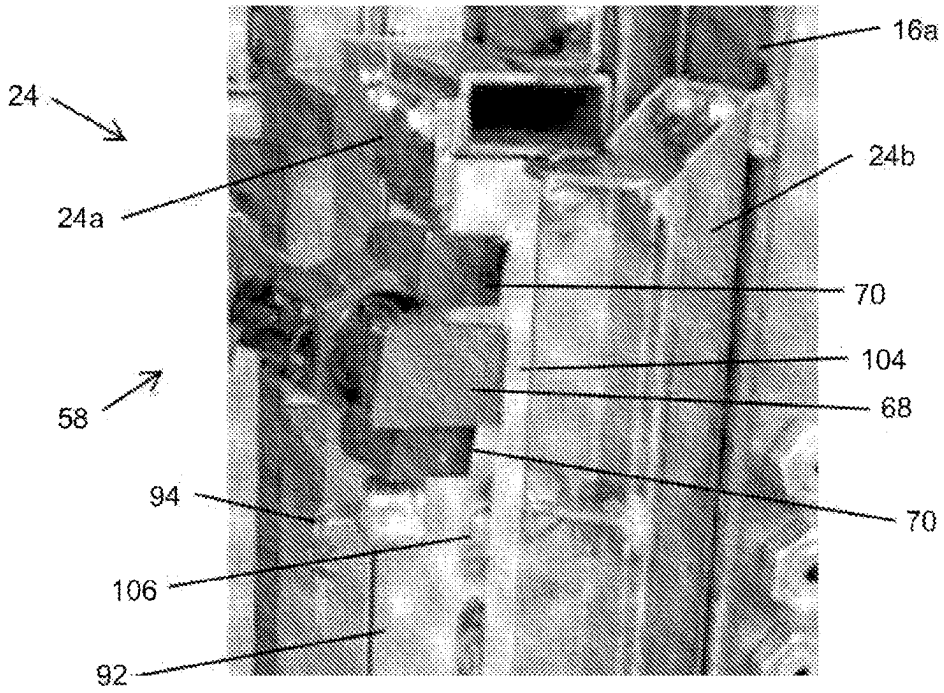

Fig. 12C

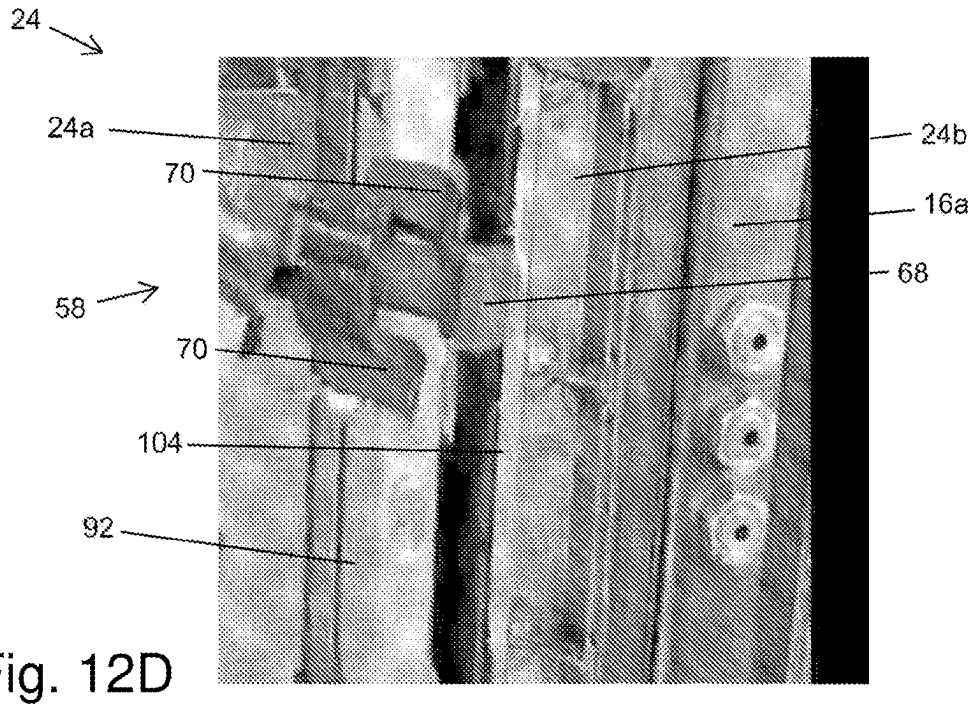

Fig. 12D

REUSABLE BREACHING TRAINING DOOR

FIELD OF THE INVENTION

[0001] The invention is from the field of forced entry through doors. In particular, the invention relates to a reusable door and frame assembly designed for training first responders, law enforcement and military personnel in the use of breaching tools.

BACKGROUND OF THE INVENTION

[0002] Breaching tools of many different types are standard equipment used by police, firefighters, and military personnel for forced entry into structures in the course of their operational duties. In order to maximize the efficiency of use of these tools and to decrease the time needed to force open doors, these personnel must be trained in their use. The doors used as training aids must be very robust to resist damage caused by the very large forces exerted on the doors and their frames by the breaching tools, especially when they are introduced into the space between the edges of the door and the door jamb.

[0003] U.S. Pat. No. 9,318,028 discloses a breaching training door assembly. A distinctive feature of this assembly is rubber mounts at the top and bottom of the upright door jamb that connect the door jamb to horizontal members at the top and bottom of the door frame. These rubber mounts are distorted when a breaching tool is inserted between the edge of a door and the door jamb, allowing the jamb to move sideward away from the door during the breaching operation. Another distinctive feature of the assembly is replaceable metal sleeves that cover and protect the edge of the door from damage caused by the breaching tools.

[0004] U.S. Pat. No. 8,926,332, which is a continuation of U.S. Pat. No. 8,408,917, discloses a training apparatus for forcible entry of a door using a prying tool such as a crowbar. The frame of the door is comprised of two vertical members called door stop jamb and hinge jamb located on either side of the door. The two jambs are mounted on a base and connected at the top by a horizontal member. The distinguishing feature of this apparatus is that the door hinges are mounted to the hinge jamb in a manner that allows sliding motion toward and away from an inner surface of the hinge jamb, and the hinges include springs that bias the sliding hinges away from the hinge jamb and which resist compression with sufficient force to simulate forces that are encountered when attempting to wedge a pry tool between the door and the door stop jamb.

[0005] It is a purpose of the present invention to provide a robust assembly for use in training defense and rescue forces to breach doors in the most realistic way, with maximum efficiency and speed.

[0006] Further purposes and advantages of this invention will appear as the description proceeds.

SUMMARY OF THE INVENTION

[0007] Disclosed herein is a training apparatus configured for training personnel in the skills necessary for breaching doors using breaching tools. The training apparatus comprises: a door and a door frame.

[0008] The door is comprised of two horizontal lengths and two vertical lengths of hollow steel profile welded at their corners to form a rectangle, wherein the profiles of the door are identified as follows: hinge side rail, lock side rail, bottom rail, and top rail.

[0009] The door frame is comprised of two horizontal and two vertical lengths of hollow steel profile welded at their corners to form a rectangle, wherein the profiles of the door frame are identified as follows: hinge side upright, lock side upright, sill, and header.

[0010] The hinge side rail of the door is connected to the hinge side upright of the door frame by hinges allowing the door to swing open or closed inside the frame.

[0011] The training apparatus is characterized in that the door frame comprises an additional upright profile that functions as the door jamb located between the lock side upright of the door frame and the lock side rail of the door. The door jamb is supported by the door frame but not fixed directly to the door frame at either the header or the sill, and the top and bottom of the door jamb are free to move sideways, forward, and backward within confined spaces attached respectively to the header and the sill of the door frame, in order to allow the door jamb to move away from the lock side rail of the door during a breaching exercise.

[0012] In embodiments of the training apparatus:

[0013] a) the jamb comprises:

[0014] i) a projecting tab or pin at the top and bottom; and

[0015] ii) a bracket below the tab or pin at the top and bottom;

[0016] b) the door frame comprises:

[0017] i) a box attached to the header and a box attached to the sill;

[0018] ii) a recess in each box;

[0019] iii) spring holders attached near the top and bottom of the lock side upright; and

[0020] iv) springs in the spring holders;

[0021] c) the projecting tabs or pins at the top and bottom of the jamb fit loosely into the recesses, thereby allowing the top and bottom of the jamb to move sideways, forward, and backward within the recesses; the springs butt against the brackets to push the jamb against the lock side rail of the door and to maintain counter pressure against the lock side rail and a breaching tool when attempting to move the jamb away from the lock side rail of the door during a breaching exercise; and

[0022] d) the springs can be easily replaced to provide springs that have different amounts of resistance to compression to provide different levels of difficulty during training.

[0023] Embodiments of the training apparatus comprise multiple holes drilled through the jamb and corresponding holes drilled through the lock side rail of the door. The holes are configured to allow insertion of pins that simulate multiple locking locations.

[0024] Embodiments of the training apparatus comprise replaceable sleeves in at least one of the holes through the jamb and the lock side rail of the door.

[0025] In embodiments of the training apparatus the replaceable sleeves have hexagonal heads.

[0026] Embodiments of the training apparatus comprise at least one of the following training assemblies: a) a gate; b) a flip up flange assembly; and c) a zero gap door assembly.

[0027] In embodiments of the training apparatus the gate is configured to train personnel to use various types of tools designed for cutting metal bars, chains, chain link fence, and padlocks.

[0028] In embodiments of the training apparatus the gate comprises a wood plank configured to allow the training apparatus to be used for training in ballistic breaching.

[0029] In embodiments of the training apparatus the door comprises a metal plate configured to allow the training apparatus to be used for training in mechanical or explosive breaching.

[0030] In embodiments of the training apparatus the flip up flange assembly is configured for training in the use of a breaching tool for breaching doors that comprise a flange that covers a gap between the door and the jamb.

[0031] In embodiments of the training apparatus the flip up flange assembly comprises:

[0032] a) a replaceable piece of sheet metal having a portion that simulates the edge of a real door that overhangs the jamb; and

[0033] b) springs that exert a force that pushes the portion of replaceable sheet metal firmly against the top of the jamb, wherein the springs can be easily replaced to provide springs that have different amounts of resistance to compression to provide different levels of difficulty during training.

[0034] In embodiments of the flip up flange assembly the replaceable piece of sheet metal is sandwiched between a metal plate and a front side of a front wall of the flip up flange assembly and the metal plate and sheet metal are bolted to the front wall.

[0035] In these embodiments of the training apparatus during a breaching exercise the breaching tool is inserted between the bottom of the portion of the sheet metal and the top of the jamb and during the procedure the breaching tool overcomes the force exerted by the springs, thereby forcing the portion of sheet metal to pivot upwards separating the door from the jamb.

[0036] In embodiments of the training apparatus the zero gap door assembly is configured for training in the use of a breaching tool for breaching a door, which abuts the frame and is locked to the frame by means of a key activated lock bolt.

[0037] In embodiments of the training apparatus the zero gap door assembly comprises:

[0038] a) a cassette subassembly; and

[0039] b) a jamb subassembly.

[0040] In embodiments of the training apparatus:

[0041] a) the cassette subassembly comprises:

[0042] i) a frame configured to be attached to the lock side rail of the door;

[0043] ii) a cassette filled with a wood insert comprised of one or more pieces of wood;

[0044] iii) a lock body installed in the wood insert;

[0045] iv) a face plate inserted on the edge of the wood insert that faces the jamb;

[0046] v) a lock bolt configured to extend outwards through the face plate or retract back into the wood insert;

[0047] vi) multiple springs configured to push the cassette towards the jamb and to provide resistance as the cassette is forced to slide into the frame away from the jamb during a breaching exercise, wherein the springs can be easily replaced to provide springs that have different amounts of resistance to compression to provide different levels of difficulty during training;

[0048] b) the jamb subassembly comprises:

[0049] i) a frame configured to be attached to a side of the jamb;

[0050] ii) a wood insert configured to fit into the frame such that one edge of the wood insert faces the face plate on the wood insert in the cassette subassembly;

[0051] iii) a strike plate and hole configured to receive the lock bolt that extends from the face plate of the cassette subassembly to lock the two subassemblies together.

[0052] In embodiments of the training apparatus the wood inserts in at least one of the cassette subassembly or the jamb subassembly are replaceable if damaged.

[0053] In embodiments of the training apparatus comprising a zero gap door assembly during a breaching training exercise, with the two subassemblies locked together, a breaching tool is inserted between the wood insert in the cassette subassembly and the jamb assembly and activated, whereupon the force exerted by the breaching tool overcomes the force exerted by the springs thereby compressing the springs and pushing the cassette into the frame until the lock bolt is pulled out of the strike plate allowing the door to be separated from the jamb.

[0054] Embodiments of the training apparatus comprise a support structure configured to minimize interference with the activities of trainees during a breaching training session.

[0055] All the above and other characteristics and advantages of the invention will be further understood through the following illustrative and non-limitative description of embodiments thereof, with reference to the appended drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0056] FIGS. **1**A and **1**B are overall views showing the training apparatus of the invention from the side of the apparatus approached by the operator of the breaching tool and the opposite side of the apparatus respectively;

[0057] FIG. **1**C shows the training apparatus **10** from the side of the apparatus approached by a trainee with the door **12** locked into the door frame;

[0058] FIGS. **2**A and **2**B show the door frame of the apparatus of FIGS. **1**A, **1**B, and **1**C from the side of the apparatus approached by the operator of the breaching tool and the opposite side of the apparatus respectively;

[0059] FIG. **2**C shows the door frame **12** from the side of the apparatus approached by a trainee;

[0060] FIGS. **3**A and **3**B show the door of the apparatus of FIGS. **1**A, **1**B, and **1**C from the side of the apparatus approached by the operator of the breaching tool and the opposite side of the apparatus respectively;

[0061] FIG. **3**C shows the door **14** from the side of the apparatus approached by a trainee;

[0062] FIGS. **4**A and **4**B show the door jamb of the apparatus of FIGS. **1**A, **1**B, and **1**C from the side of the apparatus approached by the operator of the breaching tool and the opposite side of the apparatus respectively;

[0063] FIG. **5** shows a sleeve for insertion of a locking pin;

[0064] FIG. **6** shows a gate, which is an optional feature of the training apparatus of FIGS. **1**A, **1**B, and **1**C;

[0065] FIGS. **7**A and **7**B are photographs showing two views of a hydraulic door breaker tool;

[0066] FIGS. **8**A and **8**B show two views of an assembly comprising a flip up flange;

[0067] FIG. **8**C shows a different embodiment of the flip up flange assembly of FIG. **8**A and FIG. **8**B;

[0068] FIG. **8**D and FIG. **8**E show respectively back and front views of the front part of the flip up flange assembly of FIG. **8**C;

[0069] FIGS. **9**A to **9**D are screenshots showing different stages of a breaching procedure carried out using the door breaker tool of FIGS. **7**A and **7**B on the training apparatus of FIGS. **1**A and **1**B comprising an assembly of FIGS. **8**A and **8**B;

[0070] FIGS. **10**A and **10**B show a cassette subassembly of an assembly configured to simulate a zero gap door;

[0071] FIGS. **11**A and **11**B show a jamb subassembly of an assembly configured to simulate a zero gap door; and

[0072] FIGS. **12**A to **12**D are screenshots showing different stages of a breaching procedure carried out using the door breaker tool of FIGS. **7**A and **7**B on the training apparatus of FIGS. **1**A and **1**B comprising an assembly composed of the subassemblies FIGS. **10**A to **11**B.

DETAILED DESCRIPTION OF EMBODIMENTS OF THE INVENTION

[0073] Presented herein is a training apparatus comprised of a door frame and a door that is attached to the frame by hinges. Three different training assemblies can be attached to the frame or door that are designed for training military, police, and fire personnel in the skills necessary for breaching doors using different types of breaching tools that can be used to perform methods of manual breeching, mechanical breaching, ballistic breaching, hydraulic breaching, and explosive breaching. In order to accomplish its purpose, the apparatus must, on the one hand, be configured to present the trainees with as many different scenarios as they are likely to encounter in the field and, on the other hand, be robust enough to be used repeatedly with minimal damage.

[0074] FIGS. **1**A and **1**B show the training apparatus **10** from the side of the apparatus approached by the operator of the breaching tool and the opposite side respectively. Herein the type of the door is defined by the way it is swung open in order to gain entrance into the stronghold i.e., house, room, compound etc. During a breaching exercise using training apparatus **10**, an "inwards opening" door is pushed inwards away from the operator of the breaching tool and an "outwards opening" door is pulled outwards towards the operator in order to go through it. The training apparatus **10** can be used to train on both sides, i.e. the push or the pull side. FIG. **1**C shows the training apparatus **10** from the side of the apparatus approached by a trainee with the door **12** locked into the door frame.

[0075] Training apparatus **10** is comprised of a door frame **12**, a door **14** and a "floating" jamb **16**, which is interposed between the door **14** and the door frame **12**. Jamb **16** is supported by door frame **12** but not fixed directly to the door frame **12**. The embodiment of training apparatus **10** described herein is configured such that door **14**, which is connected to door frame **12** by hinges **20***a* (see FIG. **1**C and note that two, three, or more hinges can be used) is able to swing open only in the outward direction away from door frame **12**.

[0076] Training apparatus **10** is stable enough to normally remain upright during all training exercises; however, if located on an unlevel floor or ground, supports can be added to stabilize apparatus **10**. One possible embodiment of a support structure is shown in FIGS. **1**A and **1**B. The support structure should be designed to minimize interference with the activities of the trainees during a breaching training session. Therefore in this embodiment, the corner on the lock side of door frame **12** rests on the floor and a length of angle iron **18**, which is lying on the floor, is attached to the bottom corner at the hinge side of the door frame **12** in a direction perpendicular to the plane of frame **12**. Levelling screws can be included at both ends of the angle iron **18**. In addition, as shown in FIG. **1**C and FIG. **2**C, at least one strut **18***a* can be added with its top end fastened to the hinge side upright of door frame **12** and its bottom end fastened to angle iron **18** and an additional leveling screw **18***c* can be added to a flange attached to the bottom of the lock side upright of door frame **12**. The angle iron **18** and any added struts **18***a* are attached to frame **12** using bolts that can be removed for relocating apparatus **10**. Operation of apparatus **10** is not limited by the use of a support structure and specifically not by the embodiment of support structure described herein.

[0077] Three optional training assemblies are shown attached to the door frame **12**, to the door **14**, or jamb **16** as shown in FIGS. **1**A and **1**B. These training assemblies are not necessarily components of all embodiments of training apparatus **10**. Each of them is designed for training operators for a specific skill and they can be attached to apparatus **10** when one or more of these skills are being learned. The training assemblies shown are: gate **20**, which is attached to the hinge side upright of the door frame **12**; flip up flange assembly **22**, which is attached to the lock side of door **14**; and zero gap door assembly **24**, which is comprised of two components: a cassette subassembly **24***a* attached to the lock side of the door and a jamb subassembly **24***b* attached to the jamb. These training assemblies will be described in detail herein below.

[0078] FIGS. **2**A and **2**B show door frame **12** from the side of door frame **12** approached by the operator of the breaching tool and the opposite side respectively. FIG. **2**C shows the door frame **12** from the side of the apparatus approached by a trainee. Seen in FIG. **2**B is a flat plate **26** of steel that is welded to the lock side half of header **12***d* at the top of door frame **12**. Plate **26** is design to simulate a regular door frame so that trainees will be able to insert a breaching tool in the gap between top rail **14***d* of the door and plate **26** for an upside breaching exercise. Seen in the upper and lower corners at the intersection of header **12***d* and sill **12***c* with the lock side rail **12***b* of frame **12** are assemblies **28** configured for supporting the top and bottom of jamb **16** inside door frame **12**. Additional features seen in the embodiment of FIG. **2**C are: strut **18***a*, levelling screws **18***c* and flanges **12***f* added to both ends of header **12***d* to allow the frame to be attached to a wall or other structure.

[0079] Assembly **28** comprises a box **28***a* attached, e.g. bolted or welded, to the header **12***d* and sill **12***c*. Box **28***a* defines a cavity **28***b* into which the top and bottom ends of jamb **16** loosely fit. Assembly **28** also comprises spring holders **28***c* attached to lock side upright **12***b* of frame **12**. Spring holders **28***c* are configured to support two springs **28***d* horizontally.

[0080] FIGS. **3**A and **3**B show door **14** from the side of the apparatus approached by the operator of the breaching tool and the opposite side respectively. FIG. **3**C shows the door **14** from the side of the apparatus approached by a trainee. Door **14** is composed of two horizontal and two vertical lengths of hollow steel profile welded at their corners to form a rectangle. In the figures the profiles of door **14** are identified as follows: hinge side rail **14***a*, lock side rail **14***b*, bottom rail **14***c*, and top rail **14***d*. Steel plates **26***b* are welded to the inside of the lock sides of bottom rail **14***c* and top rail **14***d* to reinforce them when breaching operations are carried out. A flat steel plate **36** is welded to the top inside of lock side rail **14***b* to simulate a flange on the lock side edge of a conventional door. Plate **36** is used to train operators in using a breaching tool near the top of an outward opening door. In the middle of door **14** are two horizontal profiles **30** and a square metal plate **32** that are present to add additions rigidity and strength to the door for using mechanical tools in breaching exercises and to provide structural elements to which components of zero gap door assembly **24** can be attached. Additional features seen in the embodiment of FIG. **3**C are: holes **110**, hinges **12***e*, and door handle **108**, which has been added for convenience and to simulate a feature of a real door.

[0081] Seen in FIG. **3**A are a plurality of nuts **38** that are attached to threaded ends of sleeves **40** (see FIG. **5**) that project through lock side rail **14***b* of door **14**. Holes **110** through which the sleeves **40** pass are drilled through the lock side rail **14***b* at various heights in order to simulate multiple locking locations that have to be ruptured to successfully breach the door. The holes **110** are located opposite similar holes **110** that are drilled through the jamb **16** (see FIGS. **4**A and **4**B). The sleeves **40** have a circular channel **48** (see FIG. **5**) that passes through their interiors. Pins **46** (see FIG. **9**D) that simulate locking or dead bolts between the door **14** and the jamb **16** can be inserted through channels **48**. Although the figures show sleeves **40** in five holes **110** in lock side rail **14***b*, in different embodiments, more or fewer holes **110** may be provided and, in different training scenarios, only one or more sleeves may be used and/or only one or more pins **46** inserted through the sleeves. In FIG. **3**B can be seen a strip **42** of steel that is welded on the face of lock side rail **14***b* that faces jamb **16**. Strip **42** comprises a plurality of hexagonal sockets into which hexagonal heads **44** of sleeves **40** fit in order to allow smooth closing of the door **14** against the jamb **16** and to prevent damage to the breaching tools caused by the heads of the sleeves if they were to project out of the profiles. The pins **46** are made of different materials depending on the degree of difficulty planned for the breaching exercise. Materials used for the pins **46** include wood, aluminum, and iron or steel of various degrees of hardness. The sleeves **40** are provided because, in exercises employing hard metal pins **46** that didn't comprise sleeves **40**, it was found that the force exerted on the pins **46** during breaching exercises causes damage to the holes **110** through the lock side rail **14***b* and jamb **16**. Over the course of many training sessions the damage accrues until replacement of the lock side rail **14***b* and/or the jamb **16** becomes necessary. The use of replaceable sleeves **40** has eliminated the need for these costly and time consuming replacements. Further, since the damage caused by the pins **46** being pulled out of the sleeves **40** during a breaching operation is restricted to the side of the interior of sleeve **40** and head **44** in lock side rail **14***b* that faces the jamb **16** (and vice versa) the sleeves **40** have been designed with hexagonal heads **44**. Thus, when, after many uses, one facet of head **44** is damaged then the nut **38** can be loosened or removed and the sleeve **40** rotated to expose the next facet. In this way the sleeve **40** can be reused many times on six different facets of its head **44** before it has to be discarded and replaced with a new sleeve **40**.

[0082] Seen in FIG. **3**B are staples **50** on lock side rail **14***b*. These are located opposite similar staples **50***a* (see FIG. **4**A) on the jamb **16**. A piece of metal or wood can be inserted between the matching staples **50** on the door **14** and staples **50***a* on jamb **16** to create closer contact between the door and the frame and to simulate a locking arrangement, e.g. a hasp or bolt of a lock.

[0083] FIGS. **4**A and **4**B show the door jamb **16** from the side of the apparatus approached by the operator of the breaching tool and the opposite side of the apparatus respectively. The door jamb **16** is an additional upright profile located between lock side upright **12***b* of frame **12** and lock side rail **14***b* of door **14**. Jamb **16** is supported by door frame **12**; but it is not fixed directly to either header **12***d* or sill **12***c*. As will be described below, the top and bottom of jamb **16** are free to float, i.e. move sideways and forward and backward, within confined spaces in order to allow jamb **16** to move away from lock side rail **14***b* of door **14** during a breaching exercise without causing damage that would occur in an actual breaching action to jamb **16** or lock side rail **14***b*.

[0084] Jamb **16** is comprised of a length of hollow steel square profile **16***a*. A first side **16***a*' of profile **16***a* faces lock side rail **14***b* of door **14**; an opposite side **16***a*" of profile **16***a* faces lock side upright **12***b* of frame **12**; a third side **16***a*"' of profile **16** faces the push side of the door; and a fourth side **16***a*"" is opposite side **16***a*"' and the pull side of the door. A narrow flat strip **16***b* of steel is welded on the third side **16***a*"' of the profile **16***a*. Strip of steel **16***b* overhangs the side **16***a*"' of the profile **16***a* on the side of the lock side rail **14***b* of the door and the lock side upright **14***b* of door **14** mimicking a flange covering the gap between the door and door jamb in real frames doors.

[0085] As discussed above, holes **110** through which sleeves **40** pass are drilled at various heights through the sides **16***a*' and **16***a*" of profile **16***a* of jamb **16** in order to simulate multiple locking locations that have to be ruptured to successfully breach the door. Seen in FIG. **4**A are the nuts **38** that are attached to threaded ends of sleeves **40** (see FIG. **5**) that project through side **16***a*" of profile **16***a*. In FIG. **4**B is seen a strip **42** of steel that is welded on the side **16***a*' of profile **16***a* of jamb **16**. Strip **42** comprises a plurality of hexagonal sockets into which hexagonal heads **44** of sleeves **40** fit in order to allow smooth closing of the door **14** against the jamb **16**. In FIG. **4**A are seen staples **50***a* that correspond to those on lock side rail **14***b* described above.

[0086] At the top and bottom of profile **16***a* is a projecting tab **52**. These tabs **52** can be formed by welding a piece of angle iron to the top and bottom of profile **16***a* as shown or alternately by machining the ends of the profile such that side **16***a*' of profile **16***a* is longer than the other three sides of the profile. In other embodiments short pins project from the top and bottom of profile **16***a* may replace tabs **52**. Also attached to sides **16***a*"' and **16***a*"" at the top and bottom of profile **16***a* are brackets **54** comprising pieces of right angle profile attached such that one face of the brackets **54** lies in a plane parallel to side **16***a*" of profile **16***a*.

[0087] The tabs **52** at the top and bottom of the profile **16***a* of jamb **16** fit into cavities **28***b* in boxes **28***a* of the assemblies **28** at the top and bottom of door frame **12**. Cavities **28***b* are large enough to allow tabs **52** to move within them both forward and backward and sideways relative to frame **12** while still being supported by frame **12** when a tool is used to force the door **14** and jamb **16** apart. Allowing jamb **16** to move in cavities **28***b* protects the jamb **16** from being bent permanently while simulating a scenario of breaching a real door in which the door jamb **16** would become distorted during the breaching process.

[0088] Springs **28***d* of assembly **28** butt against brackets **54** on profile **16***a* in order to push side **16***a*' of profile **16***a* of jamb **16** against lock side rail **14***b* of the door. By pushing against the top and bottom of jamb **16** springs **28***d* maintain counter pressure against the lock side rail **14***b* of the door and a breaching tool, thereby increasing the difficulty level of inserting the tool in the gap between the jamb **16** and lock side rail **14***b*. To create different levels of difficulty, springs **28***d* can be replaced with springs having different resistances to compressive forces attempting to move the jamb **16** in cavities **28***b*. Another function of springs **28***d* is to return the jamb **16** against the door **14** if the tool slips out of the gap, which is a common problem in breaching actions that trainees have to learn to overcome. Holes **56** in brackets **54** accommodate bolts or pins that are inserted into the center of springs **28***d* in order to stabilize their contact with the jamb **16** and prevent any possible slippage of springs **28***d* on brackets **54** during compression of the springs during the breaching process.

[0089] FIG. **5** shows a sleeve **40** that has been described herein above. Sleeve **40** is dimensioned to be inserted into a hole **110** drilled through the jamb **16** of a door frame **12** and the lock side rail **14***b* of a door **14**. Sleeves **40** are cylindrical pieces of metal having a head **44** larger than the diameter of the holes **110** in the door and jamb at one end and threads at the other end. A circular channel **48** for inserting the pins **46** (see FIG. **9**D) passes through the center of sleeve **40**. A sleeve **40** is slid through the hole until the head **44** butts against the side of the jamb **16** facing lock side rail **14***b* (or vice versa) and a nut **38** is threaded unto the threaded end of the sleeve **40** to hold it firmly in place.

[0090] FIG. **6** shows a different embodiment of the gate **20**, which is shown in FIGS. **1**A and **1**B. The gate **20** is an optional feature of training apparatus **10**. Gate **20** is a training assembly for training personnel to use various types of breeching tools. Gate **20** is connected by hinges **20***a* to the hinge side upright **12***a* of the door frame **12** (see FIG. **1**B). Gate **20** is constructed from three vertical lengths **21***a*-**21***c*, two horizontal lengths **21***d* and **21***e* of steel profile welded together to have a square or rectangular shape. A third horizontal length **21***f* is welded between vertical lengths **21***a* and **21***b*. A plurality of holes **20***b* in the horizontal profiles allow replaceable bars or rods of different types, strengths, and cross-sectional dimensions of metal or wood to be inserted to allow for training with cutting tools, e.g. manual or hydraulic bolt cutters. Also chains and pieces of chain link fence can be hung on gate **20** for training with the use of cutting tools. A flange **20***c* on the vertical profile opposite the hinges **20***a* can be configured to be locked to the door **14** by a padlock.

[0091] A wooden plank **112** is inserted into the gate **20** between vertical profiles **21***b* and **21***c* and held in place by brackets **116**. The purpose of wooden plank **112** is to allow training in ballistic breaching using, for example, a shotgun.

[0092] For other exercises a metal plate **32** is bolted to horizontal profiles **30** and allows training in mechanical breaching using tools like sledgehammers, pry bars, or battering rams to breach a door. Because metal plate **32** is bolted, not welded, to horizontal profiles **30**, it can be replaced with a new metal plate if bent or damaged beyond functionality during training. To minimize bending of the metal plate **32** caused by repeated breaching sessions using sledgehammers or rams, a covering of conveyor belt material or similar material is bolted to the side of the metal plate facing the trainee. This reduces the frequency with which the plate has to be replaced.

[0093] Additionally, training in explosive breaching can be done with small charges attached to a bare metal plate **32** or to lock side rail **14***b* of the door. Kinetic charges that will push and not cut the metal are used in these training sessions.

[0094] A vertical steel U-shaped profile **114** is added to the gate **20** for use with the wooden plank **112**. Several disks **114***a* and trailer hitches **114***b* are attached to bar **114** to respectively simulate cylinder locks and door knobs. This is used to teach trainees the proper location at which to aim the shotgun for most effective breaching. Holes **114***c* are drilled horizontally through both sides of vertical profile **114** directly behind the disks **114***a* and trailer hitches **114***b*. Wooden dowels (not shown in the figure) can be inserted through the holes **114***c* protruding a few inches beyond each side of the vertical steel profile **114**. These wooden dowels mimic the latch of a cylinder lock or the bolt of a dead bolt behind the disks **114***a* and trailer hitches **114***b* respectively. When a trainee aims the shotgun correctly, and shoots against the wooden plank **112**, the shot penetrates wooden plank **112** and breaks the wooden dowel. If the trainee aims the shotgun incorrectly, the wooden dowel will remain intact, thus giving immediate feedback to a trainee's technique and accuracy.

[0095] FIGS. **1**A and **1**B show two other training assemblies that can be added or removed from the apparatus depending on the requirements of a training session. Flip up flange assembly **22** is configured for training in the use of a breaching tool for breaching an ordinary door that has a flange that covers a gap between the door and the jamb. Zero gap door assembly **24** is configured for training in the use of a breaching tool for breaching a zero gap door, i.e. a door in which the door abuts the frame and the door is locked to the frame by means of a conventional key activated lock bolt. Both of these assemblies are configured to train individuals to breach different types of doors using different types of powered, i.e. hydraulic, pneumatic, electric, or manual, e.g. ram, sledge hammer, and pry bar, breaching tools. Below, following the description of each of these assemblies, the process of breaching the training apparatus **10** will be illustrated using the hydraulic door breaker tool manufactured by the Applicant of the present application, which is shown in FIGS. **7**A and **7**B.

[0096] FIGS. **7**A and **7***b* are photographs showing two views of a hydraulic door breaker tool **58**. Tool **58** comprises connector **60** to a manual or battery powered hydraulic pump, a piston cylinder **62**, a handle **64**, static teeth assembly/base **66**, and three wedge shaped teeth best seen in FIG. **7**B. Two of the teeth **70** are static teeth fixed to base **66**. When the hydraulic pump is activated the dynamic middle tooth **68** is advanced forward out of base **66**.

[0097] FIGS. **8**A and **8**B show flip up flange assembly **22** that is bolted to lock side rail **14***b* of the door by brackets **72***a*. Assembly **22** comprises a back wall **72** and a bottom wall **74** that are welded to brackets **72***a* and a front wall **76** that is connected to bottom wall **74** by means of a piano hinge **78**. A replaceable piece of sheet metal **80** having a right angle shaped cross section is bolted to the side of front wall **76** that faces jamb **16**. The portion **80***a* of sheet metal **80** that is perpendicular to front wall **76** simulates the overhanging edge of a real door. Piano hinge **78** allows front wall **76** and the sheet metal attached to it to swing forwards and backwards relative to back wall **72** and springs **84** inside spring housings **82** push against front wall **76**. When the door **14** of the training apparatus **10** is closed, the springs **84** push portion **80***a* of sheet metal **80** down against the top of portion **16***b* of jamb **16**. Springs **84** can be easily replaced to provide springs that have different amounts of resistance to compression to provide different levels of difficulty during training.

[0098] FIG. **8**C shows an embodiment of flip up flange assembly **22'**, which is constructed on a piece of U-shaped profile **118**. Profile **118** fits over and is bolted to lock side rail **14***b* of the door **14** by bolts **118***a*. Assembly **22'** is essentially identical to flip up flange assembly **22** and functions in the same way with changes made for durability of the assembly. Seen in FIG. **8**C is back wall **72** and front wall **76**. In this embodiment the top side of profile **118** serves as a bottom wall to which the back wall **76** and other components including side walls **122** are welded.

[0099] Flip up flange assembly **22'** is essentially comprised of two parts: a rear part that is fixed to the door via profile **118** and a front part that pivots relative to the rear part and flips up from the door jamb **16** during a breaching operation.

[0100] The rear part of flip up flange assembly **22'** comprises back wall **72** and spring housings **82** that are bolted to the back wall **72**. Springs **84** that push against front wall **76** are shown inside spring housings **82**. Also seen in FIG. **8**C is a bracket **124** that is used to support and attach a safety cover that is not shown in the figures.

[0101] FIG. **8**D and FIG. **8**E respectively show back and front views of the front part of flip up flange assembly **22'**. The front part comprises front wall **76** and a replaceable piece of sheet metal **80** having a right angle shaped cross section **80***a*. In this embodiment replaceable piece of sheet metal **80** is sandwiched between the front side of front wall **76** and a metal plate **126**. Metal plate **126** and sheet metal **80** are bolted to front wall **76** by bolts **128**. The purpose of metal plate **126** is to add strength to the sheet metal **80** reducing the frequency with which it has to be replaced. Also seen in these figures is the perpendicular portion **80***a* of replaceable piece of sheet metal **80** having a right angle shaped cross section that is bolted to the side of front wall **76** that faces jamb **16**. On the back side front wall **76** are welded hinge supports **130**. A cover **120** is welded to the top edge of the front wall **76** and tops of the hinge supports **130** in order to stabilize the hinge supports **130**.

[0102] In flip up flange assembly **22'** the hinge that connects the two parts of the assembly and which allows the front part to pivot relative to the rear part is comprised of a hollow cylindrical rod **134** (see FIG. **8**C) that passes through holes in the side walls **122** attached to bracket **118** and holes **132** near the bottom of each of the hinge supports **130**. A grease fitting **132** at the end of rod **134** allows its interior to be filled with grease and small holes in the wall of the rod at the location of each of the holes in the side walls **122** and holes **132** allow grease to leak out of the interior of rod **134** and reduce friction as the front part of flip up flange assembly **22'** pivots about the rod **134**.

[0103] As in flip up flange assembly **22** shown in FIGS. **8**A and **8**B, the portion **80***a* of sheet metal **80** that is perpendicular to front wall **76** simulates the overhanging edge of a real door. The hinge allows front wall **76** and the sheet metal **80** attached to it to swing forwards and backwards relative to back wall **72** and springs **84**. When the door **14** of the training apparatus **10** is closed, the springs **84** push portion **80***a* of sheet metal **80** down against the top of portion **16***a*"" of jamb **16**. Springs **84** can be easily replaced to provide springs that have different amounts of resistance to compression to provide different levels of difficulty during training sessions.

[0104] FIGS. **9**A to **9**D are screenshots showing different phases of a breaching procedure carried out using a door breaker tool **58** on training apparatus **10** comprising a flip up flange assembly **20**.

[0105] FIG. **9**A shows the first phase of the breaching procedure. The door **14** is closed against the jamb **16** and springs **84** push front wall **76** of assembly **20** such that sheet metal portion **80***a* overhangs jamb **16** and is pressed tightly against side **16***a*"" of jamb **16**. A nut **38** on a sleeve **40** through lock side upright **14***b* on door **14** and a head **40** of a sleeve through profile **16***a* of jamb **16** are seen in FIG. **9**A indicating the location through which a pin is inserted to simulate at least one deadbolt between door **14** and jamb **16**. In this step, dynamic tooth **68** is retracted into the base **66** of the tool **58** and, with the door breaker tool **58** held perpendicular to the plane of the door **14**, the trainee forces the edges of the two static teeth **70** and the dynamic tooth **68** at the base **66** of tool **58** between the bottom of sheet metal portion **80***a* and the top of strip of steel **16***b* of jamb **16**.

[0106] FIG. **9**B shows the completion of the first phase. At this stage the static teeth **70** and dynamic tooth **68** of the hydraulic door breaker tool **58** are completely inserted between the top of jamb **16** and the bottom of portion **80***a* of sheet metal **80**. In order to allow this and accommodate the thickness of the teeth, front wall **76** of assembly **22** and attached sheet metal **80** pivots around hinge **78** compressing springs **84**.

[0107] FIG. **9**C illustrates what happens after the tool **58** is activated causing dynamic tooth **68** to be pushed away from the base **66** of tool **58**. Two actions occur simultaneously when tool **58** is activated. Firstly, dynamic tooth **64** exerts an inwards force on the door jamb **16**, which is allowed to move inwards relative to the lock side rail **12***b* of door frame **12** by the movement of tabs **52** inside cavities **28***b* at the top and bottom of jamb **16** (see FIGS. **2**A, **2**B, **4**A, and **4**B). Secondly static teeth **70** of tool **58** exert an outwards force on sheet metal portion **80***a* causing it to flip up, i.e. the force exerted by tool **58** overcomes the force exerted by the springs **84** forcing front wall **76** of assembly **22** to pivot backwards lifting portion **80***a* of the sheet metal off the jamb **16**. The combination of these two actions causes the door **12** to begin to swing away from the frame **14** and at the same time exerts a stretching force on the pin acting as a deadbolt.

[0108] It is to be noted that, the design of assemblies **22** and **22'** mimic a real door in multiple ways including: 1) the pivot mechanism mimics the movement of a flimsy door

with a weak flange which will bend when hydraulic pressure is applied on outward swinging doors; 2) the pivot mechanism will cause the tool to slip if the trainee does not apply the right technique; 3) when the tool slips, the door resets to point zero, mimicking a real door which will slam closed when the tool slips.

[0109] FIG. **9**D shows the stage at which the dynamic tooth **68** has been completely extended from the base **66** of door breaker tool **58** and the door **14** has been successfully breached. Note how the stretching force has bent pin **46** that simulated a deadbolt and pulled it out of the head **44** of sleeve **22** in the jamb **16**.

[0110] Sets of holes are provided at various locations on lock side rail **14***b* of the door that allow the flip up flange assembly **20**,**22'** to be attached at different heights to allow a trainee to practice breaching the door by inserting the tool at the top, middle, or bottom of door **14**.

[0111] In a real situation when a door breaker tool **58** of the type shown in these figures is employed to breach a door, the edge of the door is typically damaged beyond repair and the door has to be replaced. Additionally, as the door is separated from the jamb, the teeth of the tool tend to lose their grip on the door and the jamb. Flexing and bending of sheet metal **80** simulates both of these phenomena providing the operator of the tool with realistic training. Using flip up flange assembly **22** with the training apparatus **10**, sheet metal piece **80** is easily, quickly, and inexpensively replaced when damaged allowing training apparatus **10** to be used repeatedly for many additional training sessions.

[0112] FIGS. **10**A and **10**B show a cassette subassembly **24***a* and FIGS. **11**A and **11**B show a jamb subassembly **24***b* of zero gap door assembly **24**, which is configured to simulate a zero gap door in which lock side rail **14***b* of door **14** abuts jamb **16** of the door frame **12** and the door **14** is locked to the frame **16** by means of a conventional key turned door bolt.

[0113] Cassette subassembly **24***a* is comprised of frame **86** that can be attached to lock side rail **14***b* and horizontal profiles **30** of door **14** (see FIG. **3**A) by bolts if assembly **24** is not a permanent component of training apparatus **10** or by welding for embodiments in which assembly is a permanent component. FIG. **10**A shows cassette subassembly **24***a* from the side facing the trainee/operator and FIG. **10**B shows the opposite side. Structural elements **98** function as guides defining slots at the inside top and inside bottom of frame **86** in which cassette **90** can slide. Cassette **90** is filled with a replaceable wood insert **92** comprised of one or more pieces of wood. A lock body **94** is installed in the wood insert **92** and a face plate **96** is inserted on the edge of the wood insert **92** that faces the jamb **16**. Turning a key in lock body **94** causes a lock bolt to extend outwards through face plate **96** or retract back into the wood insert **92**. Subassembly **24***a* comprises multiple springs **100** that are arranged to push the cassette **90** towards the jamb **16** and to provide resistance as the cassette **90** is forced to slide into the frame **86** away from the jamb during a breaching exercise. Four springs **100** are shown in the figures but more or less can be present in different embodiments. Springs **100** can be easily replaced to provide springs that have different amounts of resistance to compression to provide different levels of difficulty during training.

[0114] Subassembly **24***b* is shown in FIGS. **11**A and **11**B. Subassembly **24***b* comprises a frame **102** configured to be attached to side **16***a*" of profile **16***a* of jamb **16** (see FIG. **4**A) and to support a replaceable wood insert **104**. Subassembly **24***b* is attached to jamb **16** by bolts if assembly **24** is not a permanent component of training apparatus **10** or by welding for embodiments in which assembly **24** is a permanent component. Wood insert **104** fits into frame **102** such that one edge of wood insert **104** faces wood insert **92** of subassembly **24***a*. This edge of wood insert **104** comprises a strike plate and hole (not shown in the figures) that receive the lock bolt that extends from the face plate **96** to lock the two subassemblies together.

[0115] An embodiment of training apparatus **10** is configured with bolt holes that enable zero gap door assembly **24** to be mounted on either side of door **14**. Bolting cassette subassembly **24***a* and subassembly **24***b* to the opposite sides of door **14** and jamb **16** from the side shown in, for example, FIG. **1**A means that door assembly **24** will be facing a trainee who approaches apparatus **10** from the side of the gate **20**. This configuration of training assembly **10** allows for a more complex training exercise in which the trainee must first successfully breach the gate **20**, for example with a shotgun, cutting tool or a hydraulic breaching tool, and then breach the door **14**, for example using a hydraulic breaching tool.

[0116] FIGS. **12**A to **12**D are screenshots showing different phases of a breaching procedure carried out using a door breaker tool **58** on training apparatus **10** comprising zero gap door assembly **24**.

[0117] FIG. **12**A shows the first phase of the breaching procedure. The door **14** is locked to the jamb **16** by rotating a key in lock body **94** on the wood insert **92** of subassembly **24***a* that is attached to the door. Rotating the key extends a lock bolt **106** (see FIG. **12**C) from face plate **96** on the wood insert **92** into a strike plate (not visible in the figures) in the side of piece of wood **104** in frame **102** of subassembly **24***b* attached to profile **16***b* of profile **16**. In this step, dynamic tooth **68** is retracted against the base **66** of the tool **58**. With door breaker tool **58** held parallel to the plane of the door the edges of the three teeth **68** and **70** at the base **66** of tool **58** are forced between the edge of wood insert **92** in cassette **90** *od* subassembly **24***a* that simulates the door edge and the wood insert **104** in subassembly **24***b* that simulates the edge of jamb **16**.

[0118] FIG. **12**B shows the completion of the first phase. At this stage the dynamic tooth **68** and static teeth **70** of the hydraulic door breaker tool **58** are inserted between wood insert **92** in cassette **90** and wood insert **105** in frame **102** on the jamb.

[0119] Note that with assembly **24** the hydraulic door breaker tool **58** is held parallel to the door in order to force the door sideward relative to the door jam. This is opposed to assembly **22** (see FIGS. **9**A-**10**B) in which the hydraulic door breaker tool **58** is held perpendicular to the door in order to force the door to swing open away from the door jam.

[0120] In FIG. **12**C the hydraulic door breaker tool **58** is activated extending the dynamic tooth **68**, which pushes against piece of wood insert **104** while static teeth **70** exert a counter force on the wood insert **92** in cassette **90**. The force exerted by dynamic tooth **68** causes jamb **16** to move sideward away from the cassette **90** within cavity **28***b* at the top and bottom of jamb **16** (see FIG. **2**A). At the same time the force exerted by static teeth **70** pushes the cassette **90** compressing springs **100**. The combination of movement of the jamb **16** and compression of the springs **100** causes the cassette **90** to begin to move away from profile **16***a* of the

jamb **16** and allows lock bolt **106** to begin to slip out of the strike plate on wood insert **104** in the frame **102** of subassembly **24***b*.

[0121] In FIG. **12**D the dynamic tooth **68** has been extended to the point where the jamb **16** has moved in one direction and the compression of springs **100** has allowed the cassette **60** to move in the opposite direction until the distance between subassemblies **24***a* and **24***b* is large enough that lock bolt **106** slips completely out of the strike plate and the door **14** can be swung open away from the jamb.

[0122] When, in a real scenario, a hydraulic door breaker tool **58** is employed to breach a door the edge of the door and jamb are typically damaged beyond repair and have to be replaced. Using assembly **24** with the training apparatus **10**, the wooden inserts **92** and **104** are easily, quickly, and inexpensively replaced when damaged allowing training apparatus **10** to be used repeatedly for an unlimited number of additional training sessions while maintaining the exact same breaching technic used on real doors.

[0123] Although embodiments of the invention have been described by way of illustration, it will be understood that the invention may be carried out with many variations, modifications, and adaptations, without exceeding the scope of the claims.

1. A training apparatus configured for training personnel in the skills necessary for breaching doors using breaching tools, the training apparatus comprising: a door and a door frame wherein:

a. the door is comprised of two horizontal lengths and two vertical lengths of hollow steel profile welded at their corners to form a rectangle, wherein the profiles of the door are identified as follows: hinge side rail, lock side rail, bottom rail, and top rail;

b. the door frame is comprised of two horizontal and two vertical lengths of hollow steel profile welded at their corners to form a rectangle, wherein the profiles of the door frame are identified as follows: hinge side upright, lock side upright, sill, and header;

c. the hinge side rail of the door is connected to the hinge side upright of the door fame by hinges allowing the door to swing open or close inside the frame;

the training apparatus is characterized in that the door frame comprises an additional upright profile that functions as the door jamb located between the lock side upright of the door frame and the lock side rail of the door; wherein the door jamb is supported by the door frame but not fixed directly to the door frame at either the header or the sill and the top and bottom of the door jamb are free to move sideways and forward and backward within confined spaces attached respectively to the header and the sill of the door frame in order to allow the door jamb to move away from the lock side rail of the door during a breaching exercise.

2. The training apparatus of claim **1**, wherein:

a) the jamb comprises:

i) a projecting tab or pin at the top and bottom; and

ii) a bracket below the tab or pin at the top and bottom;

b) the door frame comprises:

i) a box attached to the header and a box attached to the sill;

ii) a recess in each box;

iii) spring holders attached near the top and bottom of the lock side upright; and

iv) springs in the spring holders;

c) the projecting tabs or pins at the top and bottom of the jamb fit loosely into the recesses, thereby allowing the top and bottom of the jamb to move sideways and forward and backward, within the recesses and the springs butt against the brackets to push the jamb against the lock side rail of the door and to maintain counter pressure against the lock side rail and a breaching tool when attempting to move the jamb away from the lock side rail of the door during a breaching exercise, wherein the springs can be easily replaced to provide springs that have different amounts of resistance to compression to provide different levels of difficulty during training.

3. The training apparatus of claim **1** comprising multiple holes drilled through the jamb and corresponding holes drilled through the lock side rail of the door, wherein the holes are configured to allow pins to be inserted that simulate multiple locking locations.

4. The training apparatus of claim **3**, comprising replaceable sleeves in at least one of the holes through the jamb and the lock side rail of the door.

5. The training apparatus of claim **4**, wherein the replaceable sleeves have hexagonal heads.

6. The training apparatus of claim **1** comprising at least one of the following training assemblies: a) a gate; b) a flip up flange assembly; and c) a zero gap door assembly.

7. The training apparatus of claim **6**, wherein the gate is configured to train personnel to use various types of tools designed for cutting metal bars, chains, chain link fences, padlocks, as well as breaching shotguns and hydraulic breaching tools.

8. The training apparatus of claim **6** wherein the flip up flange assembly is configured for training in the use of a breaching tool for breaching doors that comprise a flange that covers a gap between the door and the jamb.

9. The training apparatus of claim **8**, wherein the flip up flange assembly comprises:

a) a replaceable piece of sheet metal having a portion that simulates the edge of a real door that overhangs the jamb; and

b) springs that exert a force that pushes the portion of replaceable sheet metal firmly against the top of the jamb, wherein the springs can be easily replaced to provide springs that have different amounts of resistance to compression to provide different levels of difficulty during training.

10. The training apparatus of claim **9**, wherein the replaceable piece of sheet metal is sandwiched between a metal plate and front side of front wall of the flip up flange assembly and the metal plate and sheet metal are bolted to the front wall.

11. The training apparatus of claim **9**, wherein during a breaching exercise the breaching tool is inserted between the bottom of the portion of the sheet metal and the top of the jamb and during the procedure the breaching tool overcomes the force exerted by the springs, thereby forcing the portion of sheet metal to pivot upwards separating the door from the jamb.

12. The training apparatus of claim **6**, wherein the zero gap door assembly is configured for training in the use of a breaching tool for breaching a door in which abuts the frame and is locked to the frame by means of a key activated lock bolt.

13. The training apparatus of claim **12**, wherein the zero gap door assembly comprises:

a) a cassette subassembly; and

b) a jamb subassembly.

14. The training apparatus of claim **13**, wherein:

a) the cassette subassembly comprises:

i) a frame configured to be attached to the lock side rail of the door;

ii) a cassette filled with a wood insert comprised of one or more pieces of wood;

iii) a lock body installed in the wood insert;

iv) a face plate inserted on the edge of the wood insert that faces the jamb;

v) a lock bolt configured to extend outwards through the face plate or retract back into the wood insert;

vi) multiple springs configured to push the cassette towards the jamb and to provide resistance as the cassette is forced to slide into the frame away from the jamb during a breaching exercise, wherein the springs can be easily replaced to provide springs that have different amounts of resistance to compression to provide different levels of difficulty during training;

b) the jamb subassembly comprises:

i) a frame configured to be attached to a side of the jamb;

ii) a wood insert configured to fit into the frame such that one edge of the wood insert faces the face plate on the wood insert in the cassette subassembly;

iii) a strike plate and hole configured to receive the lock bolt that extends from the face plate of the cassette subassembly to lock the two subassemblies together.

15. The training apparatus of claim **14**, wherein the wood inserts in at least one of the cassette subassembly or the jamb subassembly are replaceable if damaged.

16. The training apparatus of claim **14**, wherein during a breaching training exercise, with the two subassemblies locked together, a breaching tool is inserted between the wood insert in the cassette subassembly and the jamb assembly and activated, whereupon the force exerted by the breaching tool overcomes the force exerted by the springs thereby compressing the springs and pushing the cassette into the frame until the lock bolt is pulled out of the strike plate allowing the door to be separated from the jamb.

17. The training apparatus of claim **1** comprising a support structure configured to minimize interference with the activities of trainees during a breaching training session.

18. The training apparatus of claim **6**, wherein the gate comprises a wood plank configured to allow the training apparatus to be used for training in ballistic breaching.

19. The training apparatus of claim **1**, wherein the door comprises a metal plate configured to allow the training apparatus to be used for training in mechanical or explosive breaching.

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