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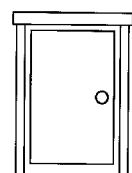
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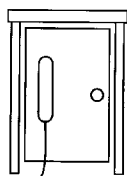
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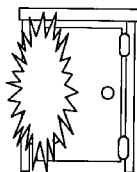
(54) Title: EXPLOSIVE DOOR BREACH TRAINING SYSTEM



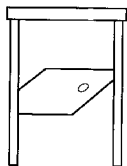
Step 1



Step 2



Step 3



Step 4

FIG. 3

(57) Abstract: The present invention provides a system for training explosive door breach techniques. The invention comprises providing an artificial explosives charge, an instrumented door, and a door blast generator with a sensor for sensing the artificial explosives charge in a position with respect to the instrumented door, as well as arming of the artificial explosives charge, and presenting a sound, light, wind, or heat effect, and actuating releasable door holders in response to door breach conditions.



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EXPLOSIVE DOOR BREACH TRAINING SYSTEM

Field of the Invention

The present invention relates in general to martial training, and in particular to simulator, kit and method for training personnel on door breach techniques.

5 Background of the Invention

Door breach exercises need to be learned by a number of people, such as police force or military personnel, who gain advantage by a surprise entry into a room. For example, soldiers need to learn how to clear and secure a room: this is part of the standard military training curriculum. Clearing a room usually involves using
10 non-lethal explosive devices to gain a tactical advantage on an adversary.

Current training curricula on door breach and room clearing includes the usage of real C4 explosives. Soldiers are trained how to gain entry into a building and gain tactical advantage over the room's occupants by strategically placing an explosive charge along specific areas of the room's door, and detonating the explosive.
15 They need to learn to place the explosive charge in a specific place depending on whether the door opens inwards or outwards.

Over the course of this training, trainees learn where to place the C4 charge on the door to achieve the desired explosive effect, and learn how the explosive is prepared and detonated. After the blasts, the doors, frames and hinges are
20 discarded as they are completely destroyed.

Replacing the door, frame and hinges for each training session is costly, and requires significant setup time between training sessions. Furthermore, the use of real C4 explosives implicates special safety handling protocols, and has other associated costs. This training module represents a significant cost over the long
25 term.

Door breach training systems known in the art include systems described in: US patents 6,877,988, and 7,611,356, US patent applications 2005/0050816,

2006/0240391, 2008/0014564, 2009/0208914, 2008/0215014, and 2010/0109294 as well as WO 2009/072948. In general these devices are directed to ballistic, and mechanical device-based door breach training systems, including frangible connectors or devices that break under door breaching conditions. None of the
5 above provides training for explosive-based door breach training.

DE 3531702 seems to teach use of a limited amount of real explosives, and the door appears to be destroyed after each forced entry.

There remains a need for a lower cost, more quickly reconfigured training technique for door breach exercises.

10 Summary of the Invention

It is an object of this invention to provide a door breach training apparatus, kit and method.

One embodiment of the invention is a door breach training apparatus comprising: a door supported in a frame by one or more releasable door holders; an artificial
15 explosive charge (i.e. door blast simulator, or simulacrum of an explosive charge); and a door blast generating means, where the door blast generator includes one or more sensors for identifying placement and activation of the artificial explosives charge in a position relative to the door, and a controller for triggering a door blast activation signal from sensor data to activate a noise maker, and effect a release
20 of the door holders.

The noise maker may be adapted to make a noise in response to the door blast activation signal, and may be adapted to make one of a plurality of noise programs in response to the door blast activation signal being of one of a predefined number of kinds. The noise maker may be a speaker.

25 The apparatus may further include a light emitter that is actuated by the door blast activation signal. The light emitter may be a high power flash lamp. The light emitter may be adapted to emit one of a plurality of flash programs in response to the door blast activation signal being of one of a predefined number of kinds. The

apparatus may further include a system for presenting a plurality of sound and light programs in response to the door blast activation signal being of one of a predefined number of kinds.

At least one of the one or more sensors may be in or on the artificial explosives charge, or mounted to the door. The controller may be in the artificial explosives

5 charge, mounted to the door, or in an enclosed compartment near the door.

The artificial explosives charge may include: a countdown switch for activating the door blast activation signal after a given amount of time; or a fuse and a detonator that generates a signal communicated to the controller. The controller may

10 include a signal transmitter for transmitting the door blast activation signal to a remote device.

The door frame may further include a reversible strike plate. The one or more releasable door holders may be magnetic or electromagnetic in operation. The door may have dual hinges for pivotally holding the door on one side, to permit the

15 door to open inwardly or outwardly. The releasable door holder(s) may include a resiliently biased member for directing or ejecting the door from the frame when the door is mounted.

The controller may include a receiver for receiving sensor information from the one or more sensors, logic for selecting one of a plurality of door blast activation signals, and a transmitter for transmitting the door blast activation signal. The

20 sensor information may include a location of the artificial explosive charge with respect to the door, a set up of the door, a charge load, and/or an environmental factor; and the logic may use such data to select the door blast activation signal.

The control may be an input/output board controlling one or more than one relay, each relay controlling a releasable door holder, and a computer for controlling the

25 input/output board. The one or more sensors may include a video surveillance camera that images the door and determines actuation of the artificial explosive charge.

Another embodiment of the invention is a kit used for door breach training, the kit including an artificial explosives charge; at least one releasable door holder for mounting a door to a door frame in at least one manner; and a controller adapted to communicate with the releasable door holder, and to activate a noise maker in
5 response to a predefined trigger, the trigger comprising an indication that the artificial explosives charge is armed and near a door.

The kit may further include at least one of the following: instructions for mounting the releasable door holder to a door frame, and a door to the releasable door holder in the at least one manner; a resiliently biased member that is designed to
10 apply a force between the door and a door frame upon release of the releasable door holder when mounted in one of the at least one manners; instructions for installing one or more sensors for identifying placement and activation of the artificial explosives charge in a position relative to the door, and for establishing the trigger from sensor data from the one or more sensors; and the one or more
15 sensors themselves, which may include magnetic sensors mounted to the door for identifying placement or activation of the artificial explosives charge relative to the door.

The controller may include an audio output to the noise maker, which may be a speaker, and the kit may further comprise the speaker. The kit may further
20 comprise an output to a light emitter such as a flash lamp, and the kit may further comprise the light emitter.

Another embodiment of the invention comprises a method for simulating a door breach, the method including: positioning and activating an artificial explosives charge near a door; sensing a position and activation of the artificial explosives
25 charge at one or more sensors; and triggering a door blast activation signal when the artificial explosives charge is to detonate; wherein the door blast activation actuates the releasable door holders and a noise making means to simulate a door breach.

The method may further include preparing the door, by mounting the releasable
30 door holder to a door frame, and a door to the releasable door holder in at least

one prescribed manner. The method may further include mounting a resiliently biased member to apply a force between the door and a door frame upon release of the releasable door holder. The method may further include installing and configuring one or more sensors for identifying placement and activation of the artificial explosives charge in a position relative to the door, and for establishing the trigger from sensor data from the one or more sensors. The method may further include mounting one or more magnetic sensors to the door for identifying placement or activation of the artificial explosives charge relative to the door; connecting an audio output of the controller to the noise maker which is a speaker; or connecting an output of the controller to a light emitter such as a flash lamp.

Further features of the invention will be described or will become apparent in the course of the following detailed description.

Brief Description of the Drawings

In order that the invention may be more clearly understood, embodiments thereof will now be described in detail by way of example, with reference to the accompanying drawings, in which:

FIG. 1 schematically illustrates one embodiment of an instrumented door;

FIG. 2 schematically illustrates one embodiment of an artificial explosive charge applied to an instrumented door of FIG. 1;

FIG. 3 schematically illustrates one embodiment of a method for simulating a door breach with images showing steps in accordance with prior art explosive door breach training; and

FIG. 4 schematically illustrates one example of a door breach training system.

Description of Preferred Embodiments

The present invention is a door breach training system for providing training experience for explosives based breaching of doors using real explosives, but at a lower cost and with increased safety. The proposed door breach training simulator can be used and re-used repeatedly. The artificial explosive charges require no

special safety handling procedures, but can be monitored to ensure that handling procedures suited to live explosives are used.

The system includes an artificial explosive charge, an instrumented door mounted to a door frame, and a door blast generator, although in different embodiments, 5 the door blast generator may be a part of the artificial explosive charge, or the door, or door frame, it is presently preferred to provide the door blast generator as a separate component.

FIG. 1 schematically illustrates an instrumented door 10 mounted to a frame 11 in accordance with one embodiment of the invention. The door 10 shown may be an 10 entirely conventional door, a door of rugged construction that can survive use over an extended work life, or may be designed to be mounted substantially differently than a conventional door.

The door may have hinges on one side so as to permit conventional pivotal opening of the door, especially in situations where the door breach exercise may 15 target destruction of a locking mechanism and not demolition of the door. The hinge may be designed for pivotal coupling of the door to permit the door to open inwards or outwards, permitting the same door frame and system to be configured for breach training on inward or outwardly opening doors. The door may split in the middle in some scenarios, and pivot along half of the door. If the door can 20 open both ways, a reconfigurable system may be provided. The hinges may include release mechanisms to permit selective decoupling of the hinges, to make it possible to enact a door being blown off its frame.

Alternatively the door may be designed only for enacting scenarios in which the door is blown off the frame, in which case the door may have no effective hinge 25 and can be held in place in any practical manner, unconstrained by normal door functioning.

The door 10 as shown includes two hinges 12, and two releasable door holders 14 which effectively fix the door to the frame, and release the door from the frame, upon suitable actuation. The releasable door holders should be

positioned in a manner to hold the door in place prior to a door breaching training session, and may be configurable in one or more than one manner. The hinges 12 may be actuable to decouple from the frame in the event of a door breach. If so, the hinges 12 are also releasable door holders. These releasable

5 door holders can be magnetic or a latching mechanism. The releasable door holder can be controlled electronically. A reversible strike plate may be mounted to the frame, providing a reconfigurable element that may indicate how charges should be placed.

The instrumented door may further comprise a resiliently biased member for

10 directing fall of, or ejecting the door from the frame when the mounted door is released. For example, a passive wedge shaped members or springs or actively controlled elements can be interposed between the frame 11 and door 10 to project the door away from the door frame, as it would be after an explosion. A motion of the door may depend on release of one or more of the releasable door

15 holders, or on an order and timing in which the one or more releasable door holders are released. The system can therefore permit different responses on the door to the charges, and may include partial obstruction of the door or damage without breach, for example, in the case that the charges are not well placed, or not suitable to the task, etc. The wedges or other compliant members may be

20 installed after the frame is mounted, may be integrated into the releasable door holders, or may be actuated elements of the releasable door holders, for example.

The door 10 and frame 11 may be configured for mounting in several poses; these poses may allow for the door to be released and to fall in different manners, and in any given pose, an order and timing of release of the releasable door

25 holders may alter a direction in which the door falls. When trainees practice door breach techniques, they use visual cues from the door's construction to determine if the door opens inward or outward. These visual cues include: the placement of hinges, the position of the strike plate and the door casing characteristics. In one embodiment of the invention the instrumented door hardware (strike plate and

30 hinges) provides trainers with the ability to configure whether the door opens from the inside or from the outside. For example if the door opens inwardly, the strike

plate will point to the inside, and vice versa. In one embodiment of the invention, the door system has a strike plate which can be set to point inward or outward. Furthermore dual hinges can also be used to provide the required visual cues. Another way to achieve this is to flip the hinges 180 degrees.

- 5 FIG. 2 schematically illustrates the instrumented door of FIG. 1 with an artificial explosive charge 20 attached thereto. The artificial explosive charge 20 is a handheld device, which may be of a same size, form, weight and color as the explosives charge they represent. The artificial explosive charge 20 preferably includes a countdown mechanism, or fuse such as would be used to arm a live
- 10 charge for detonation, however the countdown device or fuse does not detonate any charge, but the arming is communicated to a controller of the system. The countdown mechanism, when armed may provide a visual indication of the blast delay time.

- FIG. 3 schematically illustrates the system from a perspective of a trainee. Initially
- 15 a door, such as instrumented door 10 is provided, and the trainee has access to an artificial charge 20. The trainee applies the artificial charge 20 to instrumented door 10 in step 2, and sets the charge. The positioning and activation of a suitably selected artificial explosives charge in a suitable location near a door may be one important component of the curriculum of the trainee. If the door opens
- 20 inwards, the explosive charge should be placed near the hinges. When the charge detonates, the explosion blows the door off its hinges and the trainees can enter the room. If the door opens from the outside, the explosive charge should be placed in the middle of the door. When the charge detonates, the explosion bends the door and the door is projected inside the room. The position and
- 25 arming of the artificial explosives charge is sensed by the system. The artificial charge 20 detonates (step 3) at a time that is decided by the system, and the resulting effects (sound, light, heat, and/or wind) are presented as the instrumented door 10 is controlled to respond accordingly. The resulting effects preferably at least include actuation of a noise maker, which may be a mechanical
- 30 system, may be embedded in the door 10 or frame 11, but preferably includes a speaker. The noise maker may be adapted to make one of a plurality of noise

programs depending on a scenario being presented. The resulting effect preferably includes a light, such as a high power flash lamp. Similarly the light emitter may be adapted to emit one of a plurality of flash programs in response to the scenario presented. In step 4 the door is shown blown down in the illustrated
5 scenario, indicating a successful breach. If the trainee does not place the artificial explosives charge in the appropriate location, feedback will be provided to the trainee and the door's explosive behavior may be restricted accordingly.

In order to accomplish this, a door blast generator is provided. The door blast generator includes at least a sensor for identifying placement and activation of the
10 artificial explosives charge 20 in a position relative to the door, and a controller for triggering a door blast activation signal from sensor data, to activate a noise maker (or other presentation), and effect a release of the releasable door holders. The noise maker could be part of the door frame, the instrumented door or inside the room the trainees are attempting to breach, for example. A light emitter can
15 be provided for additional effect. The light emitting means could be located in the door blast simulator, integrated in the door frame, in the door blast generator or even in the room.

The sensor data may include a video or camera image that identifies placement and activation of the artificial explosives charge 20, and video or image data may
20 further be used for other training and recordal purposes. The sensor data may include proximity detectors, or near field signaling devices for determining a position of the artificial explosives charge 20, or may include magnetic or electromagnetic sensors embedded within the door that are responsive to permanent magnets or electrical circuits within the artificial explosives charge 20,
25 for example.

The artificial explosives charge 20 may have electrical or magnetic signaling means, either responsive to interrogation by an electric or magnetic field, or may be powered by an on-board power source. For example, a RF ID tag may be embedded within the artificial explosives charge 20. Alternatively, the controller
30 may be embedded within the artificial explosives charge 20, along with a sensor

- for detecting the door, or one or more reference markers with respect to the door, for example, sufficient to identify a position and orientation with respect to the door. If the artificial explosives charge 20 is adapted to effect presentation of the scenario (e.g. actuate the noise maker) and effect the unlocking of the doors, the
- 5 system is centered on the artificial explosives charge 20. Electrical contacts between the door and a part of the artificial explosives charge 20 may be sufficient for signaling the release of one or more of the releasable door holders. Alternatively the controller may further comprise a communications subsystem, such as a wireless communications subsystem.
- 10 The door blast generator may also be provided in the door. The door may include the sensors, circuits for individually controlling the releasable door holders (in parallel or as a serial bus), and can further have a circuit for controlling the noise maker. The noise maker may be a mechanical hammer, piezoelectric, smart material actuator, thermomechanical actuator on a resonating membrane to
- 15 produce the noise. Conveniently, the resonating membrane may be a wall of the door. Furthermore a resonating cavity may be provided between the walls to amplify the sound.
- Finally the door blast generator may be a separate unit communicating between the sensors and actuators in any convenient fashion. Typically such separate
- 20 units are out of view of the trainees. If so, the controller comprises: a receiver for receiving sensor information from the one or more sensors and a transmitter for transmitting the door blast activation signal. The controller may be a computer with software for running a serious gaming environment.
- The controller preferably includes logic for selecting one of several door blast
- 25 activation signals, that differently affect the releasable door holders and the presentation. The logic may depend on a location of the artificial explosive charge with respect to the door, a set up of the door, a charge load, and/or an environmental factor, or other preprogrammed, or user command prompt (e.g. from a trainer), to select the one of several door blast activation signals.

30 EXAMPLE

FIG. 4 schematically illustrates an example of the door breach training system 25, was used to demonstrate the present invention. The door breach training system 25 includes the artificial explosives charge 20, and controller 30. The controller 30 includes a signal receiver 26, a processor 28 and an audio output 29 to speakers. The controller 30 was a computer driving a peripheral Input/Output (I/O) board 33. The I/O board 33 controls one (in the present example) or more relays, each releasable door holders 14 being controlled by a respective relay. Other available relays 34 may be used for mechanical actuation of a sound maker 29', or any other method of manufacturing a short burst of loud noise or for any light, heat or wind effects accompanying the door breach.

The signal receiver 26 as shown receives sensed information from a sensor that is embedded in the artificial explosives charge 20 via wireless communications. Specifically the instrumented door has a back wall surface that is provisioned with a plurality of magnets that can be reconfigured for arbitrary placement. The artificial explosives charge 20 has commercially available magnetic sensors for detecting the magnets. Field strength of the magnets is chosen to provide a desired spatial sensitivity of the artificial explosives charge 20. When the artificial explosives charge 20 is positioned within a provisioned distance from the magnets the magnetic sensors detect them, and the sensor signal is communicated with an armed signal, and time delay to the controller 30. While this position sensor is accurate and specific, and inexpensive, the magnets must be placed by trainers on the back side of the door at a time and manner such that they are not visible to trainees. More complicated magnetic field patterns and sensor arrangements can be used to overcome this deficiency, in similar systems.

When the artificial explosives charge 20 is positioned and armed, and the countdown time expires, the artificial explosives charge 20 sends a signal to receiver 26 of the controller 30. Specifically a wireless signal transmitter is used. When the processor 28 determines that a blast condition is met, it triggers an event in the I/O board. The processor 28 then activates relays, which turns on the releasable door holder(s) 14. The processor 28 also signals noise maker 29. The one or more than one releasable door holders will unlatch the door, which swings

open. The system is configured to use speakers for manufacturing a short burst of loud noise. The system can also include light emitting means which will enhance the presentation of an explosion.

5 The instrumented door used was designed for crack open test procedures, in which door latch mechanisms are defeated without demolishing the door. As such a regular door frame, regular (interior) hollow wood door, and hinged mounting were used. The door is entirely standard with door knob hardware. The only difference is that the door latch mechanism was disassembled and reassembled deficiently so that the door knob did not have any traction on the
10 door latch. The door latch extended through the strike plate and into a recess in the frame, as usual. The releasable door holder consisted of a single solenoid push rod mounted within the recess of the frame, and designed to reciprocate therein to the extent that it could displace the door latch when actuated. The door was mounted with springs to open the door once the latch ceases to counter the
15 spring force.

Controller 30 can be battery powered for use in remote training facilities. Controller 30 is also capable of signaling a serious gaming environment in a gaming engine 40 electronically (e.g. via network messages through communications subsystem 32, which may or may not subsume receiver 26).
20 Such signaling may indicate that a door blast has detonated, and may be controlled entirely or partially by the gaming engine 40. This enables the integration of the door blast system within a serious gaming environment.

Signaling the gaming engine 40 permits the virtual elements of the audio/video presentation of the serious gaming environment to react to the door blast. This
25 reaction can be easily programmed by someone skilled in the art in order to provide an immersive training experience. The serious game integrated version can be used in military training facilities.

The proposed digital solution will allow instructors to quickly design breach scenarios, that can be reconfigured, and reuse the door between training

sessions. An embodiment of this invention can operate in a stand-alone and in game integrated mode.

Claims:

1. An explosive door breach training apparatus comprising:
a door supported in a frame by one or more releasable door holders;
an artificial explosives charge; and
a door blast generator including:
one or more sensors for identifying placement and activation of the
artificial explosives charge in a position relative to the door, and
a controller for triggering a door blast activation signal from sensor data
to activate a noise maker, and effect a release of the door holders.
2. The explosive door breach training apparatus of claim 1 further
comprising:
the noise maker adapted to make a noise in response to the door blast
activation signal;
the noise maker adapted to make one of a plurality of noise programs in
response to the door blast activation signal being of one of a
predefined number of kinds;
the noise maker in the form of a speaker;
a light emitter that is actuated by the door blast activation signal;
a light emitter in the form of a high power flash lamp; or
a light emitter adapted to emit one of a plurality of flash programs in
response to the door blast activation signal being of one of a
predefined number of kinds;
a system for presenting a plurality of sound and light programs in
response to the door blast activation signal being of one of a
predefined number of kinds.
3. The explosive door breach training apparatus of claim 1 wherein at
least one of the one or more sensors is in the artificial explosives charge, or
mounted to the door.

4. The explosive door breach training apparatus of claim 1 wherein the controller is in the artificial explosives charge, mounted to the door, or in an enclosed compartment near the door.
5. The explosive door breach training apparatus of claim 1 wherein the artificial explosives charge comprises;
 - a countdown switch for activating the door blast activation signal after a given amount of time;
 - a fuse and a detonator that generates a signal communicated to the controller; orthe controller, which further comprises a signal transmitter for transmitting the door blast activation signal.
6. The explosive door breach training apparatus of claim 1 wherein the one or more releasable door holder includes a releasable magnetic door holder.
7. The explosive door breach training apparatus of claim 1 further comprising a reversible strike plate mounted to the frame.
8. The explosive door breach training apparatus of claim 1 further comprising dual hinges for pivotally holding the door on one side.
9. The explosive door breach training apparatus of claim 1 wherein the releasable door holder comprises a resiliently biased member for directing or ejecting the door from the frame when the door is mounted.
10. The explosive door breach training apparatus of claim 1 wherein the controller comprises: a receiver for receiving sensor information from the one or more sensors, logic for selecting one of a plurality of door blast activation signals, and a transmitter for transmitting the door blast activation signal.
11. The explosive door breach training apparatus of claim 10 wherein the receiver for receiving sensor information includes a location of the artificial explosive charge with respect to the door, a set up of the door, a charge load,

and/or an environmental factor; and the logic for selecting one of a plurality of door blast activation signals uses the available information to select the door blast activation signal.

12. The explosive door breach training apparatus of claim 1 wherein the control further comprises: an input output board controlling one or more than one relays, each releasable door holder being controlled by a relay, and a computer for controlling the input output board.
13. The explosive door breach training apparatus of claim 1 wherein the one or more sensors comprises a video surveillance camera that images the door and determines actuation of the artificial explosive charge.
14. A kit used for explosive door breach training comprising:
 - an artificial explosives charge;
 - at least one releasable door holder for mounting a door to a door frame in at least one manner; and
 - a controller adapted to communicate with the releasable door holder, and to activate a noise maker in response to a predefined trigger, the trigger comprising an indication that the artificial explosives charge is armed and near a door.
15. The kit of claim 14:
 - further comprising instructions for mounting the releasable door holder to a door frame, and a door to the releasable door holder in the at least one manner;
 - wherein the releasable door holder is a magnetic releasable door holder;
 - further comprising a resiliently biased member that is designed to apply a force between the door and a door frame upon release of the releasable door holder when mounted in one of the at least one manners;
 - further comprising instructions for installing one or more sensors for identifying placement and activation of the artificial explosives charge in

- a position relative to the door, and for establishing the trigger from sensor data from the one or more sensors;
 - further comprising one or more sensors for identifying placement and activation of the artificial explosives charge in a position relative to the door;
 - further comprising one or more magnetic sensors mounted to the door for identifying placement or activation of the artificial explosives charge relative to the door;
 - wherein the controller further comprises an output to the noise maker which is a speaker;
 - wherein the controller further comprises an output to the noise maker which is a speaker, and wherein the kit further comprises the speaker;
 - wherein the controller further comprises an output to a light emitter which is a flash lamp; or
 - wherein the controller further comprises an output to a light emitter such as a flash lamp, and wherein the kit further comprises the light emitter.
16. A method for simulating an explosive door breach, the method comprising:
- positioning and activating an artificial explosives charge near a door;
 - sensing a position and activation of the artificial explosives charge at one or more sensors; and
 - triggering a door blast activation signal when the artificial explosives charge is to detonate;
- wherein the door blast activation signal actuates releasable door holders and actuates a noise maker, to simulate a door breach.
17. The method of claim 14:
- further comprising preparing the door by mounting the releasable door holder to a door frame, and a door to the releasable door holder in at least one prescribed manner;
 - further comprising preparing the door by mounting the releasable door holder to a door frame, and a door to the releasable door holder in at

least one prescribed manner, wherein the releasable door holder is a magnetic releasable door holder;

further comprising preparing the door by mounting the releasable door holder to a door frame, and a door to the releasable door holder in at least one prescribed manner, wherein a resiliently biased member is mounted to apply a force between the door and a door frame upon release of the releasable door holder;

further comprising installing and configuring one or more sensors for identifying placement and activation of the artificial explosives charge in a position relative to the door, and for establishing the trigger from sensor data from the one or more sensors;

further comprising mounting one or more magnetic sensors to the door for identifying placement or activation of the artificial explosives charge relative to the door;

further comprising connecting an audio output of the controller to the noise maker which is a speaker;

further comprising connecting an output of the controller to a light emitter which is a flash lamp.

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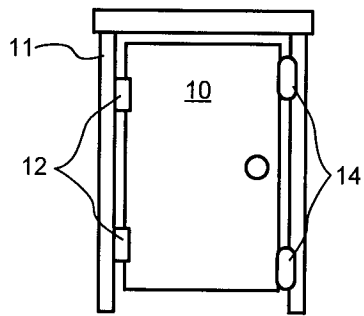


FIG. 1

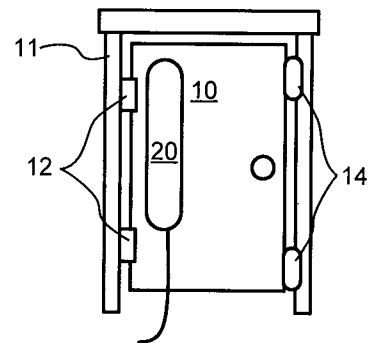
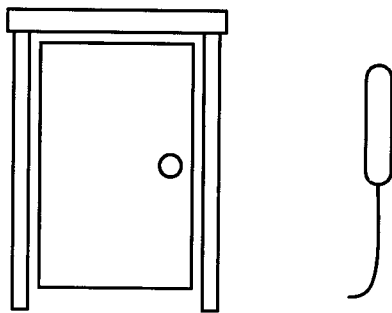
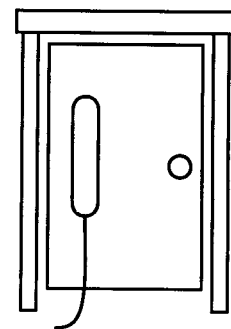


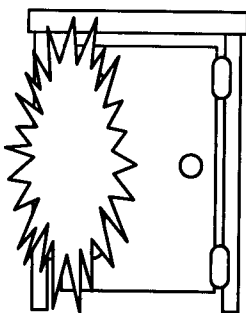
FIG. 2



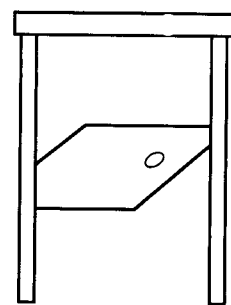
Step 1



Step 2



Step 3



Step 4

FIG. 3

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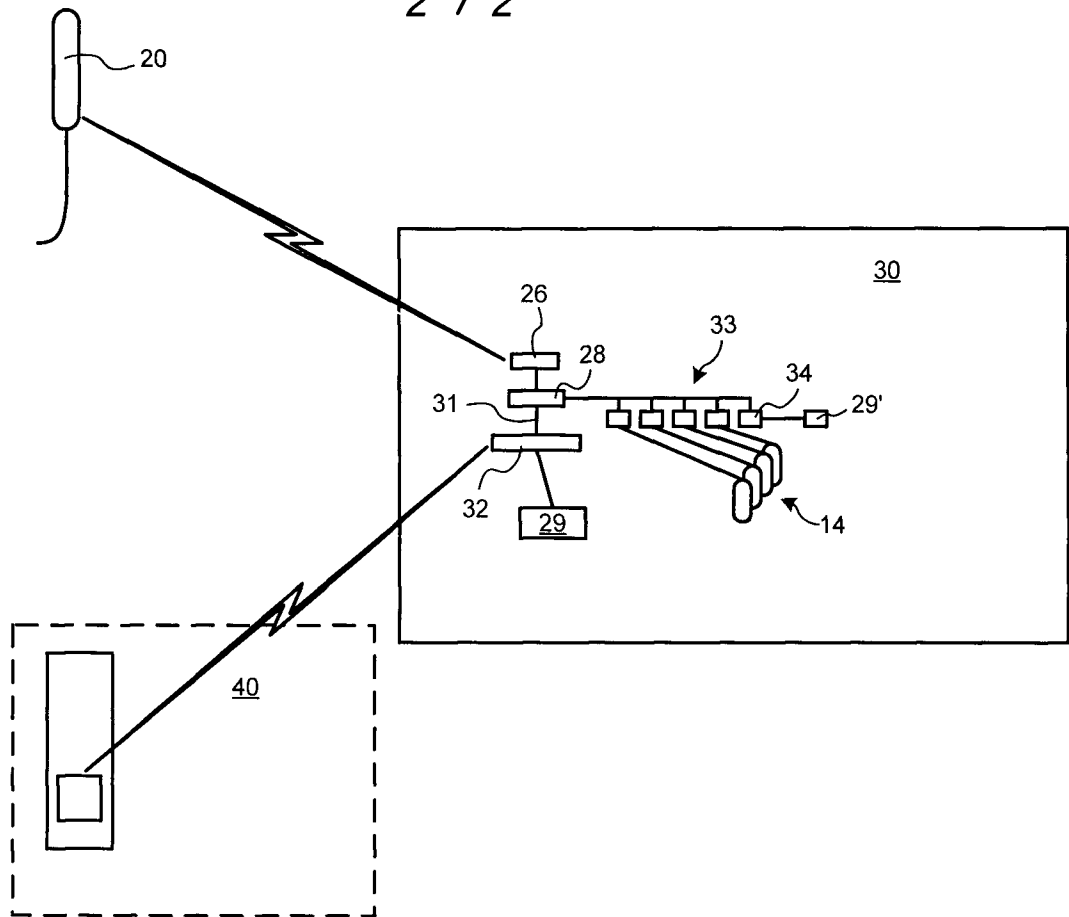


FIG. 4

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CA2011/000214

A. CLASSIFICATION OF SUBJECT MATTER IPC: F42B 4/18 (2006.01) , F41H 13/00 (2006.01) , G09B 9/00 (2006.01) According to International Patent Classification (IPC) or to both national classification and IPC														
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) IPC: F42B 4/18, F41H 13/00, G09B 9/00 USPC: 434/all, 89/1.14 Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched none Electronic database(s) consulted during the international search (name of database(s) and, where practicable, search terms used) EPOQUE (epodoc), Canadian Patents Database Keywords: door, training, explosive, breach, breech, controller, sensor														
C. DOCUMENTS CONSIDERED TO BE RELEVANT <table border="1"> <thead> <tr> <th>Category*</th> <th>Citation of document, with indication, where appropriate, of the relevant passages</th> <th>Relevant to claim No.</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>US2009/0188188 A1 (RIVET) 30 July 2009 (30-07-2009) *fig. 18; para. 101*</td> <td></td> </tr> <tr> <td>A</td> <td>US2006/0240391 A1 (SOVINE ET AL.) 26 October 2006 (26-10-2006) *entire document* cited by applicant</td> <td></td> </tr> <tr> <td>A</td> <td>DE3531702 A1 (DAMBERG) 05 March 1987 (05-03-1987) *entire document* cited by applicant</td> <td></td> </tr> </tbody> </table>			Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.	A	US2009/0188188 A1 (RIVET) 30 July 2009 (30-07-2009) *fig. 18; para. 101*		A	US2006/0240391 A1 (SOVINE ET AL.) 26 October 2006 (26-10-2006) *entire document* cited by applicant		A	DE3531702 A1 (DAMBERG) 05 March 1987 (05-03-1987) *entire document* cited by applicant	
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A	US2009/0188188 A1 (RIVET) 30 July 2009 (30-07-2009) *fig. 18; para. 101*													
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A	DE3531702 A1 (DAMBERG) 05 March 1987 (05-03-1987) *entire document* cited by applicant													
☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex. <table border="1"> <tbody> <tr> <td>* Special categories of cited documents :</td> <td>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</td> </tr> <tr> <td>"A" document defining the general state of the art which is not considered to be of particular relevance</td> <td>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</td> </tr> <tr> <td>"E" earlier application or patent but published on or after the international filing date</td> <td>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</td> </tr> <tr> <td>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</td> <td>"&" document member of the same patent family</td> </tr> <tr> <td>"O" document referring to an oral disclosure, use, exhibition or other means</td> <td></td> </tr> <tr> <td>"P" document published prior to the international filing date but later than the priority date claimed</td> <td></td> </tr> </tbody> </table>			* Special categories of cited documents :	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention	"A" document defining the general state of the art which is not considered to be of particular relevance	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone	"E" earlier application or patent but published on or after the international filing date	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art	"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&" document member of the same patent family	"O" document referring to an oral disclosure, use, exhibition or other means		"P" document published prior to the international filing date but later than the priority date claimed	
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Date of the actual completion of the international search 26 May 2011 (26-05-2011)		Date of mailing of the international search report 7 June 2011 (07-06-2011)												
Name and mailing address of the ISA/CA Canadian Intellectual Property Office Place du Portage I, C114 - 1st Floor, Box PCT 50 Victoria Street Gatineau, Quebec K1A 0C9 Facsimile No.: 001-819-953-2476		Authorized officer Andrew Davidson (819) 953-4505												

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CA2011/000214

Patent Document Cited in Search Report	Publication Date	Patent Family Member(s)	Publication Date
US2009188188A1	30 July 2009 (30-07-2009)	CA2638123A1	30 January 2009 (30-01-2009)
US2006240391A1	26 October 2006 (26-10-2006)	US2006240391A1 US7789666B2 US2010311015A1	26 October 2006 (26-10-2006) 07 September 2010 (07-09-2010) 09 December 2010 (09-12-2010)
DE3531702A1	05 March 1987 (05-03-1987)	None	