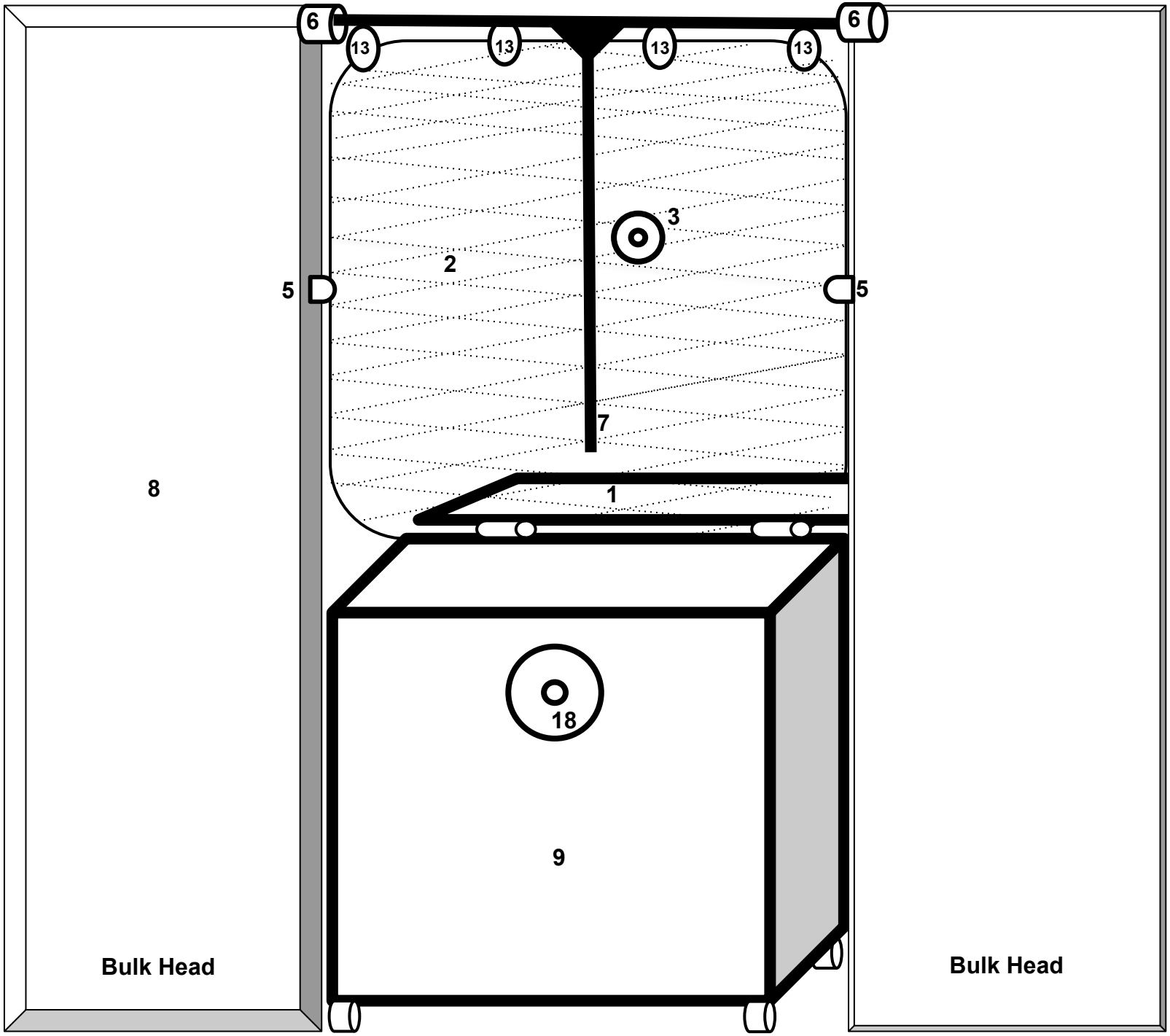
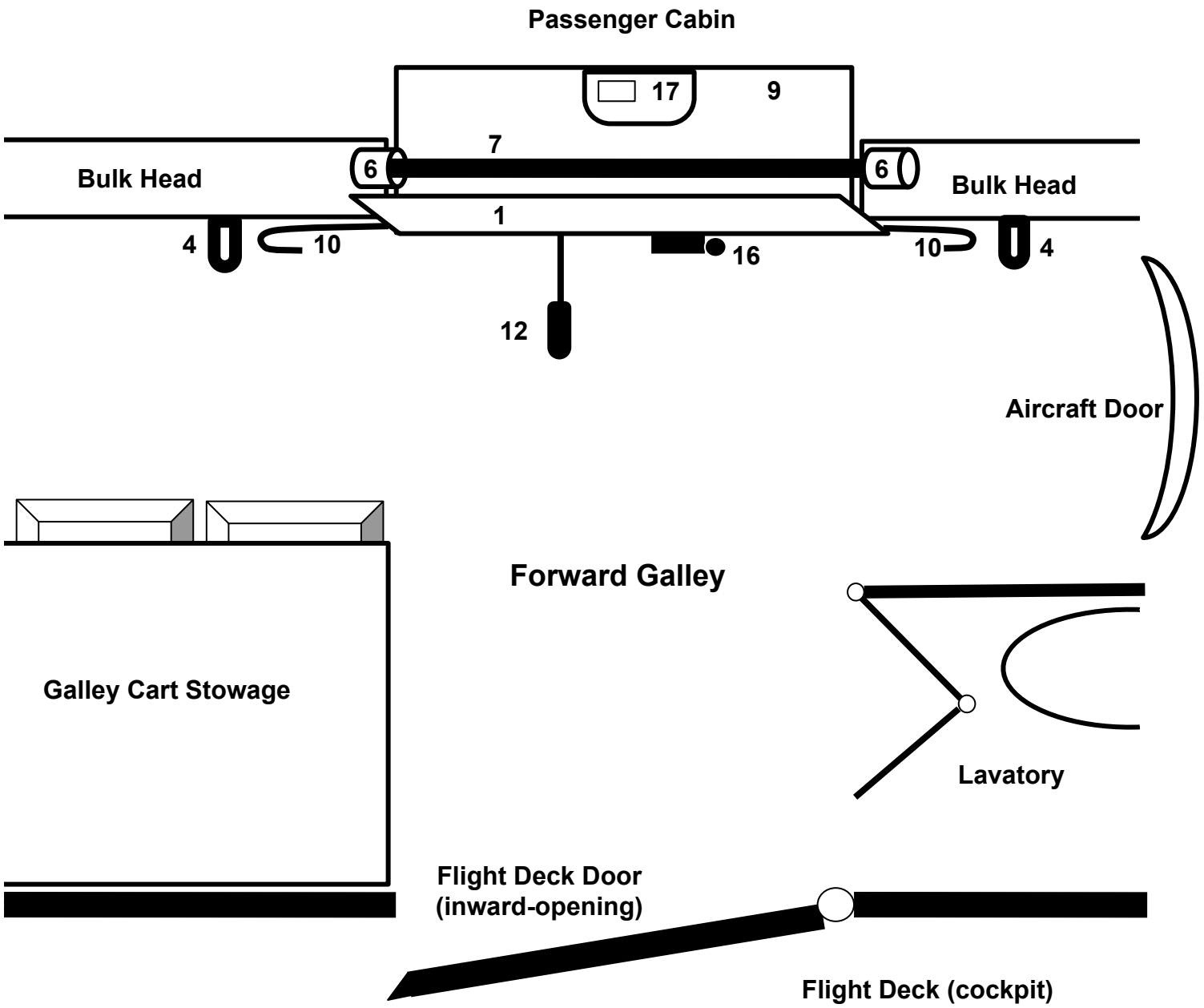
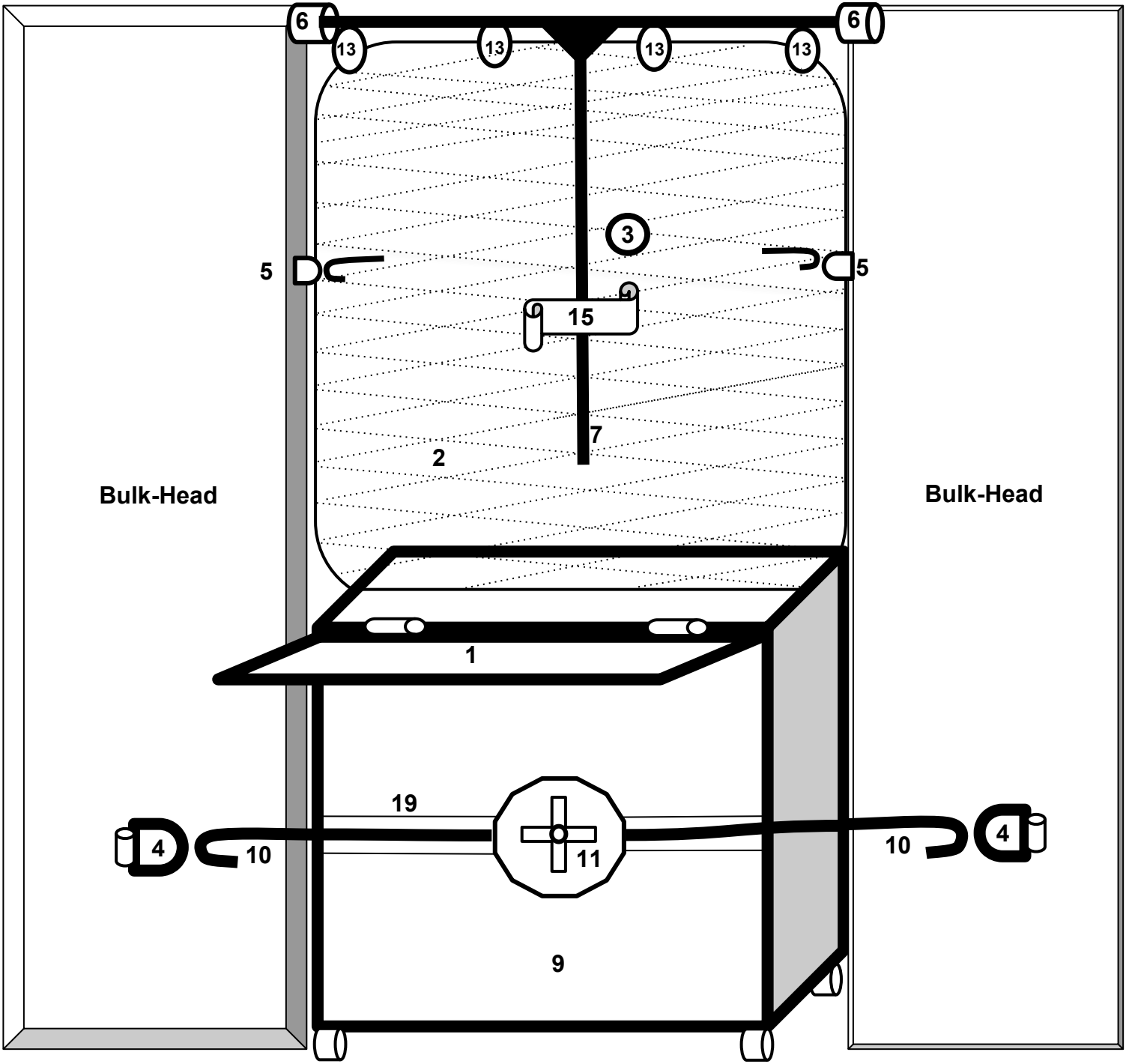


(FIG. 1: VIEW SEATED IN MAIN CABIN)



(FIG. 2: AERIAL VIEW FORWARD GALLEY)



(FIG. 3: VIEW INSIDE FORWARD GALLEY)

FIG. 4

FIG. 5

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

October 31, 2017 Application No. 15/799,391

TITLE: Anti - Terrorist Anti - Personnel Mobile Commercial Passenger Aircraft Physical Flight Deck / Cockpit Secondary Barrier Forward Galley Cart / Aircraft Secondary Barrier Cart (ASBC) - Accelerated Exam requested due to suicidal terrorism threat

INVENTOR: Robert James MacLean

FIELD OF THE INVENTION

[0001] A mobile secondary barrier system to prevent a suicidal individual from sprinting and diving into a commercial passenger aircraft Flight Deck, during Flight Deck door transitions during flight, in order to destroy the aircraft while in flight.

BACKGROUND

[0002] Solo suicidal terrorist attacks, also known as “lone wolf attacks,” are becoming more common daily. “Lone wolf attacks” are delivered by such means as Improvised Explosive Devices (IED) worn on the body or contained in a vehicle, or driving a speeding vehicle into a crowd of victims. Just in the last 17 months, there have been 15 Vehicle-ramming attacks by Lone Wolf method in Europe and the U.S.

[0003] Suicidal “lone wolf attacks” without weapons on commercial passenger aircraft (aircraft) Flight Decks are a very real threat because of the inability of detection by airport security screening machines, airport screeners, law enforcement, and the Intelligence Community. Firearms pose less of a threat because of their detectable metallic parts, the fear of extinguishing all ammunition and being restrained, and the limited killing ability—a standard semi-automatic pistol’s 18 rounds cannot neutralize a

single-aisle aircraft of over 100 passengers. Planning, building, hiding, and smuggling IEDs requires special material, numerous experts, and planning—such a major operation and its operatives are likely to be detected.

[0004] After the September 11, 2001 terrorist attacks (9/11), a pilot will not risk total destruction of the aircraft by unlocking the Flight Deck under duress. Pilots know that a terrorist prefers to quickly die than risk spending life in solitary confinement.

[0005] Given that a weaponless attacker wants to die fast, he is very likely to first injest a strength and numbness inducing drug such as Phencyclidine (P.C.P.) in order to overpower the pilots and wrench the Flight Deck controls. On September 13, 2006, a group of passengers and an air marshal team had to restrain a man on P.C.P. trying to open the rear exit door of United Airlines Flight 890 Airbus A320 flying from Los Angeles International Airport to Washington Dulles International Airport.

[0006] Sprinting and diving into a Flight Deck, also know as a “cockpit,” only needs one weaponless attacker and one opportunity during the numerous instances when one of the two pilots enter or exit the cabin during flight (door transition) in order to use the lavatory, obtain sustenance, or crew-rest. The only secondary barrier invention that exists is one that is built into the cabin’s main choke-point: the forward galley entrance.

[0007] The Ohio State University and the University of Newcastle issued a Research Report (No. 281.12.2011) titled, “Cost-Benefit Analysis of Aviation Security: Installed Physical Secondary Barriers, Federal Air Marshal Service, and Federal Flight Deck Officer” and wrote on PAGE 11: “The cost of [a secondary barrier built into an aircraft] for a single aircraft is approximately $25,000 in 2004 (AT 2004) - when adjusted for

inflation this is approximately $30,000 in 2011 dollars. Since there are approximately 6,000 commercial aircraft in the U.S., this equates to $180 million. If we round this up to $200 million, and this cost is annualised over 20 year design life of an aircraft with a 3% discount rate, this equates to a present value cost of $13.5 million per year." PAGE 21: "CONCLUSIONS We have generally underestimated the likely risk reduction supplied by existing security measures. However, even with these assumptions in place, it appears that the expensive Federal Air Marshal Service [(FAMS)] very substantially fails a cost-benefit assessment. Moreover, insofar as FAMS does reduce risk, almost all of that benefit can be obtained with a very inexpensive mix of security measures: the installation of physical secondary barriers (IPSB) to entering the cockpit for those brief and fleeting moments when the cockpit door is opened during flight, and doubling the budget of the Federal Flight Deck Officer [(FFDO)] program. Overall, a policy that includes IPSBs, an increased budget for FFDOs, and a reduced budget for FAMS may well be optimal."

BRIEF SUMMARY OF THE INVENTION

[0008] A mobile secondary barrier galley cart system to prevent a weaponless person from sprinting and diving into an unlocked commercial passenger aircraft Flight Deck in order to destroy it. Aircraft downtime is eliminated due to it being mobile and can be instantly replaced upon landing for its maintenance. Because it stows away, it cannot be sabotaged.

[0009] This perfectly effective inflight security invention is a relatively inexpensive mobile commercial passenger aircraft galley cart physical secondary barrier to stop an

individual from sprinting and diving into an unlocked flight deck in order to destroy it during flight. A mobile system is not built into the cabin therefore the aircraft would require no downtime to repair or replace it. A mobile system is safer because it cannot break, wedge into the forward galley entrance, and stop emergency egress. A mobile system cannot be sabotaged because it is stowed and locked into the starboard bow of the aircraft instead of the forward galley entrance and exposed to all passengers.

BRIEF DESCRIPTION OF THE DRAWINGS

[00010] Some embodiments of the present invention are illustrated as an example and are not limited by the figures of the accompanying drawings, in which like references may indicate similar elements and in which:

[00011] FIG. 1 - Figure 1 depicts the view of the aircraft forward galley entrance from the cabin when the ASBC is deployed.

[00012] FIG. 2 - Figure 2 depicts the aerial view of the aircraft forward galley when the ASBC is deployed.

[00013] FIG. 3 - Figure 3 depicts the aerial view of the ASBC stowed in the forward galley.

[00014] FIG. 4 - Figure 4 depicts the side view of the male tips of the T-rod’s top portion being inserted into the female channel-lock mechanism.

[00015] FIG. 5 - Figure 5 depicts the side view of the male tips of the T-rod’s top portion engaged into the female channel-lock mechanism and ready for a Flight Deck door transition.

DETAILED DESCRIPTION OF THE INVENTION

[00016] Technical Problems:

Most commercial passenger aircraft do not have a secondary barrier system to prevent an individual from sprinting and diving into a Flight Deck in order to destroy the aircraft while in flight.

[00017] Despite 9/11, air carriers do not build Flight Deck secondary barriers into the vast majority of newly manufactured aircraft. Until there is a regulatory or legal mandate to build barriers into brand new cabins, thousands of existing aircraft cannot be cost effectively retrofitted.

[00018] A Flight Deck secondary barrier is needed to stop an attacking individual for at least five seconds so that a pilot can close the Flight Deck door and emergency land the aircraft. Due to 9/11, most, if not all Flight Deck doors can withstand, a strong individual attempting to break it down, long enough to emergency land.

[00019] Inward-opening Flight Deck doors are exceptionally more vulnerable to an attack because the door swings against a pilot the moment he/she opens it. An attack on an outward-opening door gives a crew member the chance to use his/her backside to close it in which the frame reinforces the door. An attack on an outward-opening doored Flight Deck requires the attacker to have to wedge himself between the door and the frame if he cannot dive into the Flight Deck semi-impeded or unimpeded. Only spring-latches protect Flight Decks with an inward-opening door. There exist approximately 1,187 existing aircraft with inward-opening doors.

[00020] Most aircraft that fly over large bodies of water are wide-body (two aisles). It is more difficult to attack the Flight Deck on a wide-body aircraft than a single-aisle one

due to the extra distance between the Flight Deck entrance and the first row in the cabin.

[00021] The prior art Garofani Installed Physical Secondary Barrier (GGIPSB) system (Patent Publication No. US20060000946 — Inventors Primo, Dante, and Renato Garofani) is expensive to manufacture, install, and maintain do to its relatively excessive weight and bulkiness, and the fact it has to be built into the aircraft.

[00022] The GIPSB is installed in the busiest choke-point of the aircraft: to the right of the main aircraft entry door and inside of the cabin entrance for the forward galley.

[00023] Once the GIPSB has been installed, it gets degraded after being subjected to usage during deployments. The GIPSB stows into the cabin entrance for the forward galley leaving it to protrude into the aisle being exposed to all of the passing crew members, passengers, luggage, and galley carts. Due to it being in the busiest transit area of the aircraft, the GIPSB gets damaged by passengers accidentally hitting it with their carry-on luggage or the flight crew running into it with sustenance galley carts.

[00024] An inoperable GIPSB not only leaves the aircraft vulnerable to destruction, but it takes the aircraft out of service for an extended duration: While an GIPSB maintenance order is drafted and transmitted by an aircrew member, an GIPSB technician gets dispatched, a technician assesses the damage, a technician orders the GIPSB parts, the parts may have to be manufactured if not in stock, and finally, the time it takes to repair and/or replace the GIPSB. Because the GIPSB has to be glued, riveted, or screwed into the aircraft cabin, there also exists the potential of damage to the cabin which would also need a different type of maintenance team to repair it.

[00025] An inoperable GIPSB takes an aircraft temporarily out of service and reduces air carriers' profits.

[00026] Another danger posed is the GIPSB's large main-housing, attached to the forward galley entrance, can collapse during severe turbulence or a hard-landing and prevent emergency egress through the aircraft's main choke-point and exit.

[00027] Most aircraft rely on the current inferior method of a flight attendant standing in front of the Flight Deck door with or without a standard sustenance galley cart in front of him. There is also a reliance of government air marshals who are rarely on flights and when they are aboard, they cannot respond fast enough to an attacker sprinting and diving into the Flight Deck.

[00028] Between 2009 and 2011, the volunteer, non-profit organization, "Radio Technical Commission for Aeronautics" (RTCA) conducted a study and issued a report on September 28, 2011 titled, "Aircraft Secondary Barriers and Alternative Flight Deck Security Procedures (RTCA DO-329)."

[00029] RTCA DO-329 concluded that not having a secondary barrier physically mounted or mechanically attached to the cabin could result in an attacker crashing an aircraft after a door transition. The method of an aircrew member standing in front of a standard sustenance galley cart or having no cart was defeated by padded-up role players who were likely unwilling to attack a simulated flight deck at full speed and strength and subject themselves to injury. The role-player U.S. Department of Homeland Security / Transportation Security Administration (TSA) / Federal Air Marshal Service (FAMS) Federal Air Marshals (FAM) also anticipated a sprint-dive-attack. FAMs

in a real world scenario are subjected to cabin noise, seat-belted, distracted with reading or watching video, or are taking an authorized nap.

[00030] The results of RTCA DO-329 were so disturbing, the TSA and the U.S. Department of Transportation / Federal Aviation Administration redacted the report and marked it as “SENSITIVE SECURITY INFORMATION.”

[00031] Until March 2, 2016, the unredacted RTCA DO-329 was withheld from TSA-FAMS Supervisory Federal Air Marshals in charge of field offices’ training divisions, TSA-FAMS trainers, and rank-and-file TSA FAMs who routinely fly protective missions while armed with firearms.

[00032] Four of the five role-player FAMs in the RTCA DO-329 study are supervisory or managerial FAMs, some of whom have since been promoted.

[00033] While the RTCA DO-329 invited air carrier representatives, and pilots and flight attendants union representatives, it did not invite any professional law enforcement non-union organizations who lobby on behalf of FAMs. Such organizations are the Fraternal Order of Police, the Federal Law Enforcement Officers Association, and the Air Marshal Association. FAMs cannot form common bargaining-unit unions that have contracts with U.S. Government agency senior leadership.

[00034] Due to human error, sometimes pilots exit and enter the Flight Deck without establishing any type of human or combination of human and standard sustenance galley cart barrier.

[00035] The RTCA DO-329 study concluded that an installed physical secondary barrier needs to only stop an attacker for at least five seconds so that a pilot can lock the

reinforced Flight Deck door, begin emergency landing, and potentially armed himself/herself with a Federal Flight Deck Officer firearm in its locked container in the case the attacker breaches both the barrier and the door.

[00036] In 2017, the Department of Transportation / Office of Inspector General issued a report concerning secondary barriers titled, "[Federal Aviation Administration] Has Taken Steps To Identify Flight Deck Vulnerabilities But Needs To Enhance Its Mitigation Efforts[.]"

[00037] Solution to Problem:

The ASBC looks very similar to a sustenance galley cart except that it locks into the forward galley entrance, its top lid **(1)** opens, inside is an expandable rigid or fabric/net barrier **(2)**, the barrier then can be folded out (rigid) and/or hooked around (fabric/net) the top portion of the forward galley entrance.

[00038] A fabric/net curtain barrier is more advantageous to a rigid one due to its light weight and ability to easily see an imminent attack through it. A rigid barrier or opaque curtain needs a peep-hole **(3)** to surveil the cabin of a potential attack.

[00039] The ASBC transforms into a commercial aircraft forward galley entrance physical secondary barrier that can be instantly replaced, if it malfunctions, after landing.

[00040] The ASBC will not only save on government armed air marshal deployment costs, but will 100% eliminate the danger to aircraft flight decks — also known as cockpits — during inflight Flight Deck entries or exits during flight. The dividend would also substantiate allowing more air marshals to detect "lone-wolf attackers," and

conduct IED prevention, counterterrorism, and insider-threat search activities in our mass-transit centers.

[00041] Advantageous Effects of Invention:

The ASBC system is considerably less expensive than the GIPSB for the fact the cabin would only need a tiny alteration: the two spring-loaded recessed D-rings **(4)** installed inside the cabin entrance of the forward galley to lock the ASBC into place, four recessed D-rings **(5)** to attach the curtain to the sides of the the cabin entrance of the forward galley, and two female channel-locks **(6)** to engage a fabric curtain and its T-rod **(7)** into the cabin ceiling immediately above the cabin entrance of the forward galley.

[00042] Maintenance of the ASBC saves air carrier costs because it can be instantaneously replaced after landing without a technician, parts order, cabin repair, and the time needed to repair or replace a damaged or inoperable GIPSB.

[00043] Due to the GIPSB's over-engineering (i.e., numerous retractable cables and locking mechanisms) air turbulence could also cause it to become inoperable during flight.

[00044] Due to an GIPSB being in the the area of the highest passenger, carry-on luggage, and sustenance galley cart traffic that could accidentally damage and render it inoperable, it presents a vulnerability to the Flight Deck due to the fact it cannot be repaired or replaced until after landing.

[00045] The ASBC is stowed and locked into the starboard side of the forward galley and cannot be damaged by passenger and equipment traffic.

[00046] Premeditating his attack, an attacker can chemically (cyanoacrylate glue) or mechanically sabotage an GIPSB while crew members and passengers are distracted, or when cabin lights are dimmed or off. Such an opportunity is likely while the attacker stands next to the GIPSB waiting to use the lavatory inside of the forward galley.

[00047] To avoid sabotage, a solenoid lock on a closed-circuit has to be activated from inside of the Flight Deck in order to release the ASBC from stowage.

[00048] In case the solenoid lock malfunctions, the emergency Torx Wrench can disengage it.

[00049] The ASBC's main-housing is rectangular box on wheels with a hinged lid **(1)** on top that folds toward the Flight Deck when deployed.

[00050] The ASBC's main-housing can be made with a combination of steel, high-grade polymer, alloy, and carbon-fiber.

[00051] Metallic 4.43mm (T25) Flat Torx Bolts 10mm long **(8)** are the primary hardware for the ASBC.

[00052] On the side that faces the Flight Deck during a door transition, the ASBC's main-housing **(9)** has two extra gauge retractable woven steel cables with metallic safety-hooks **(10)** at the ends that connect to the two recessed spring-loaded D-rings **(4)** behind each bulk-head on each side of the ASBC. When deployed, the two main-housing cables **(10)** run horizontal inside of a 1 cm wide recessed gulley **(19)** for extra stability of the main-housing **(9)**. Once the two main-housing cables **(10)** are deployed and tightened, it becomes exceptionally more difficult for an attacker to tip the

ASBC over like a standard wheeled sustenance galley carts used for the current method.

[00053] For better stowage, the two main-housing cables **(10)** remain inside of the recessed gulley **(19)** when retracted.

[00054] The flexibility of the two main-housing cables **(10)** allow the ASBC to form fit into a cabin entrance of a forward galley that is not symmetrically shaped due to numerous different cabin configurations.

[00055] The two ASBC main-housing cables **(10)** have a recessed ratcheting system **(11)** in order to immobilize and strengthen the ASBC's stability after deployment. The ratcheting system **(11)** is on the starboard side of the ASBC. The ratcheting system **(11)** has a release lever to disengage the ASBC's two main-housing cables **(10)** before stowage.

[00056] In the case that the ratcheting system malfunctions and cannot be disengaged, an emergency 4.43 mm T25 Torx Wrench **(12)** is attached to the Flight Deck door side of the ASBC's main-housing and can be used to release the ratcheting system's locking mechanism.

[00057] The ratcheting system **(11)** shall be recessed for easier stowage.

[00058] Inside of the ASBC is an attached folding-barrier **(2)** made of steel rings and a T-rod with a projectile-proof cloth-type curtain. The curtain can be made out of the popular projectile-proof armor material, DuPont™ Kevlar®.

[00059] The ASBC's curtain **(2)** has two safety-hooks and an approximately 100cm x 75cm T-rod **(7)** with at least four net-rings **(13)** attached to its top (horizontal) portion.

When the curtain or net is retracted, at least four safety-hooks **(14)** attach the vertical sides of the curtain to recessed spring-loaded D-rings screwed into both sides of the cabin entrance into the forward galley.

[00060] The top of the T-rod has 45-degree male channel-locking ends **(6)**. The ends are lipped to prevent sliding back and forth.

[00061] At a 315-degree angle from inside the forward galley, the top of the T-rod gets inserted into female channel-lock system **(FIG. 4)** bolted into the top of the forward galley entrance. Once fully inserted into the female channel-locks, the T-rod swings down and fully engages at the 270-degree angle **(FIG. 5)**. The vertical portion is secured down with a cloth VELCRO® strap **(15)** sewn onto the bow side of the deployed curtain.

[00062] The T-rod **(7)** stows into the ASBC's main housing with its curtain. The T-rod **(7)** allows the crew member, of any height, to attach the curtain to the top of the forward galley entrance. The the horizontal portion of the T-rod **(7)** is as wide as the ASBC's main housing **(9)** and the vertical portion is as long as the height of the main housing **(9)**. The ends of the horizontal portion of the T-rod **(7)** are lipped so that it cannot slip out of the two female channel-locks **(6)** bolted into both sides of the top of the forward galley entrance. The horizontal portion of the T-rod **(7)** is shaped to lock into the two female channel-locks **(6)** in the ceiling.

[00063] A rigid ASBC folding-barrier **(2)** has to be tall enough to prevent an attacker from diving over it and into an unlocked Flight Deck.

[00064] An air carrier has the option to request that the ASBC's folding-barrier **(2)** be a translucent net or a curtain that is projectile-proof from firearms or an IED.

[00065] Due to the numerous different types of aircraft and cabin configurations, the size of the ASBC's main-housing **(9)** and folding-barriers **(2)** vary.

[00066] The ASBC main-housing **(9)** height should be a minimum of 100 cm and width of 25 cm.

[00067] The ASBC's bow side has a panic-button covered with a protective hinged cover. The panic-button would allow a crewmember to engage a nine-volt battery operated sonic alarm **(17)** so that the pilot can go back into and lock the Flight Deck then emergency land.

[00068] The sonic alarm **(17)** is also wired to a passive infrared motion sensor on the ASBC's stern side.

[00069] ASBC's stern side has a infrared motion sensor **(18)** in case an attacker gets out of his seat and moves toward the forward galley. This sensor **(18)** becomes activated after the two main-housing cables **(10)** are extended and the lid **(1)** opens. An activated infrared motion sensor triggers the sonic alarm.

[00070] The sonic alarm's **(17)** nine-volt battery pack is inside the main-housing **(9)** with a spare battery. There is a low-battery flashing red light-emitting diode indicator.

ABSTRACT

[00071] Anti-Terrorist Anti-Personnel Mobile Commercial Passenger Aircraft Physical Secondary Barrier Forward Galley Cart — Aircraft-Secondary-Barrier-Cart (ASBC) is

100% effective in stopping an attack on the Flight Deck and is exceptionally more inexpensive than the GIPSB.

[00072] As proven by the RTCA DO-329 study, a Flight Deck installed physical secondary barrier does not need to be impenetrable, it only needs to stop an attacker for at least five seconds, long enough for the pilot to lock the reinforced Flight Deck door and quickly emergency land. If the attacker breaks down the ASBC and the reinforced Flight Deck door, enough time will have elapsed for the pilot to unlock a Federal Flight Deck Officer firearm's container, load it with ammunition, and have it ready for a Flight Deck breach. Due to its mobility, the ASBC causes no aircraft downtime in the case of malfunction. The ASBC is stowed and secured away from the cabin and cannot be sabotaged by an attacker.

*** * * END * * ***

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15/799,391	10/31/2017	3612	280			

CONFIRMATION NO. 9839

ROBERT MACLEAN
[redacted]

FILING RECEIPT

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Date Mailed: 11/03/2017

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Inventor(s)

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Assignment For Published Patent Application

[redacted]

Power of Attorney: None

Domestic Applications for which benefit is claimed - None.
A proper domestic benefit claim must be provided in an Application Data Sheet in order to constitute a claim for domestic benefit. See 37 CFR 1.76 and 1.78.

Foreign Applications for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.) - None.
Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

Permission to Access Application via Priority Document Exchange: Yes

Permission to Access Search Results: Yes

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If Required, Foreign Filing License Granted: 11/03/2017

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 15/799,391**

Projected Publication Date: To Be Determined - pending completion of Missing Parts

Non-Publication Request: No

Early Publication Request: Yes

Title

Anti - Terrorism / Anti - Personnel Mobile Commercial Passenger Aircraft Physical Flight Deck / Cockpit Secondary Barrier Galley Cart / Aircraft Secondary Barrier Cart ((ASBC)

Preliminary Class

296

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

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