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(54) **Combined passive and active vehicle fire prevention system**

(57) A vehicle fire prevention system comprises a passive fire prevention system (26) to be associated with a fuel tank (22) on the vehicle (20). An active fire prevention system (30) is associated with a crew compartment

(24) in the vehicle (20). A control link (40,42) provides a signal to actuate the active fire prevention system (30). In addition, a vehicle (20) incorporating the fire prevention system is also disclosed and claimed.

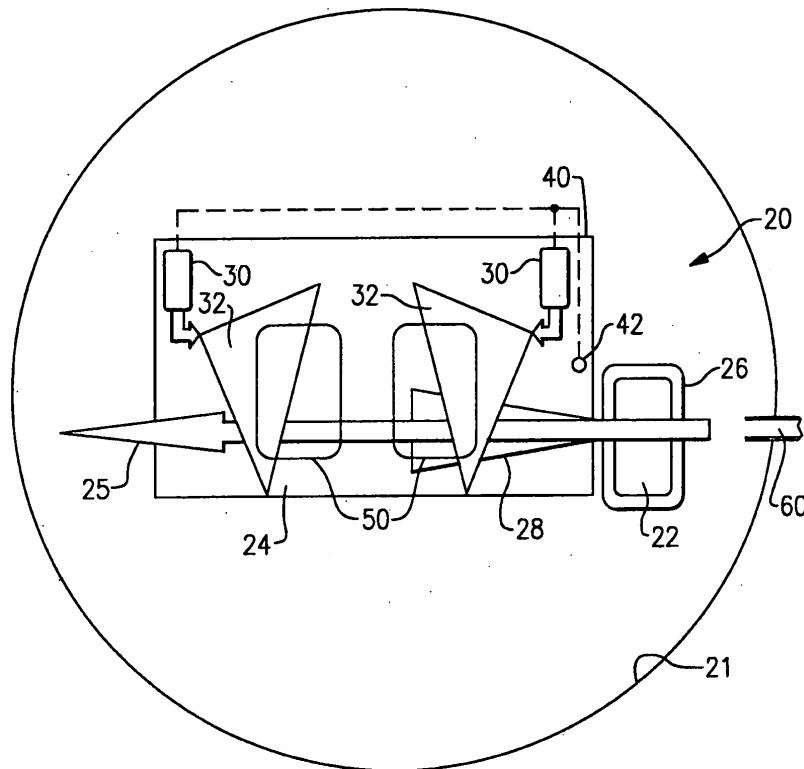


FIG.1

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Description**BACKGROUND OF THE INVENTION**

[0001] This application relates to the combination of a passive fire protection system associated with a vehicle fuel tank, which operates in conjunction with an active system associated with the crew compartment.

[0002] Ground vehicles and aircraft used for military applications are typically provided with fire control systems. In the event that a projectile pierces a vehicle shell, the fire prevention systems come into play to minimize the potential damage.

[0003] One type of fire prevention system is a passive system which is placed to surround a fuel tank. One type of passive system is known as powder panels, and includes surrounding elements filled with a suppressant agent. If a projectile pierces the fuel tank, it will also pierce the panels. A powder agent is delivered into the pierced fuel tank.

[0004] Another type of fire prevention system is a so-called active system. An active system is provided with some sort of sensor, and is typically utilized to deliver fire control material, such as powder, into a crew compartment of the vehicle.

[0005] It is sometimes the case that a projectile will pass entirely through a fuel tank, and then enter the crew compartment. To date, the passive and active systems have not been associated to operate in conjunction with each other.

SUMMARY OF THE INVENTION

[0006] A vehicle fire prevention system comprises a passive fire prevention system to be associated with a fuel tank on the vehicle. An active fire prevention system is associated with a crew compartment in the vehicle. A control link provides a signal to actuate the active fire prevention system. In addition, a vehicle incorporating the fire prevention system is also disclosed and claimed.

[0007] These and other features of the present invention can be best understood from the following specification and drawings, the following of which is a brief description.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008]

Figure 1 schematically shows a fire prevention system for a vehicle.

Figure 2 shows a fuel tank provided with powder panels.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0009] A vehicle 20 is shown schematically in Figure

1. Fuel tanks 22 may be placed at various locations within the vehicle shell 21. The fuel tank 22 is shown provided with a passive fire prevention system, such as a powder panel 26. Figure 2 shows a more detailed view of powder panel 26 associated with the fuel tank 22. Other type of passive systems may be associated with the fuel tank, and still come within the scope of this invention.

[0010] A crew compartment 24 is also shown as evidenced by seats 50. As shown schematically, a control line 40 connects a sensor 42 to the passive system 26. The active systems 30 may be provided with additional controls such that they may be actuated for any number of additional reasons. However, within this invention, when the sensor 42 determines that there has been a breach of the crew compartment, then the active systems 30 are actuated. The sensor may be of a known sensor such as a fast acting optical flame sensor. However, other type sensors may also be utilized.

[0011] The vehicle 20 may be a ground based vehicle such as a tank, or may be an aircraft. Further, other types of vehicles would come within the scope of this invention.

[0012] As shown, a projectile 25 has pierced the shell 21 at 60, the passive fire prevention system 26, the fuel tank 22, and the crew compartment 24. The passive system 26 will deliver powder as shown at 28 into the crew compartment and into the fuel tank. Active fire prevention systems 30 are also delivering powder as shown at 32 into the crew compartment 24.

[0013] The fire suppressant materials may be any number of types. For example, the fire suppressant utilized in the crew compartment could be a vaporizing liquid such as Halon 1301, or a Halon replacement agent such as a hydrofluorocarbon (HFC) or a perfluorinated ketone. Other types of suppressants may be FM-200, HFC-227ea, heptafluoropropane, Novec 1230, FK-5.1.12, dodecafluoro-2-methylpentan-3-one, water, or water plus potassium acetate.

[0014] Although an embodiment of this invention has been disclosed, a worker of ordinary skill in this art would recognize that certain modifications would come within the scope of this invention. For that reason, the following claims should be studied to determine the true scope and content of this invention.

Claims

1. A vehicle fire prevention system comprising:

a passive fire prevention system (26) to be associated with a fuel tank (22) on the vehicle (20); an active fire prevention system (30) to be associated with a crew compartment (24) in the vehicle (20); and a control link (40,42) to provide a signal to actuate said active fire prevention system (30).

2. The vehicle fire prevention system as set forth in

claim 1, wherein said passive fire prevention system includes powder panels (26).

3. The vehicle fire prevention system as set forth in claim 1 or 2, wherein said control link includes a fast acting optical flame sensor (42). 5
4. A vehicle (20) comprising:
 - a fuel tank (22); 10
 - a crew compartment (24);
 - a passive fire prevention system (26) associated with the fuel tank (22);
 - an active fire prevention system (30) associated with the crew compartment (24); and 15
 - a control link (40,42) to provide a signal to actuate said active fire prevention system (30).
5. The vehicle as set forth in claim 4, wherein said passive fire prevention system includes powder panels (26). 20
6. The vehicle as set forth in claim 4 or 5, wherein said control link includes a fast acting optical flame sensor (42). 25
7. The vehicle as set forth in any of claims 4 to 6, wherein said vehicle (20) is a ground vehicle.
8. The vehicle as set forth in any of claims 4 to 6, wherein said vehicle (20) is an aircraft. 30

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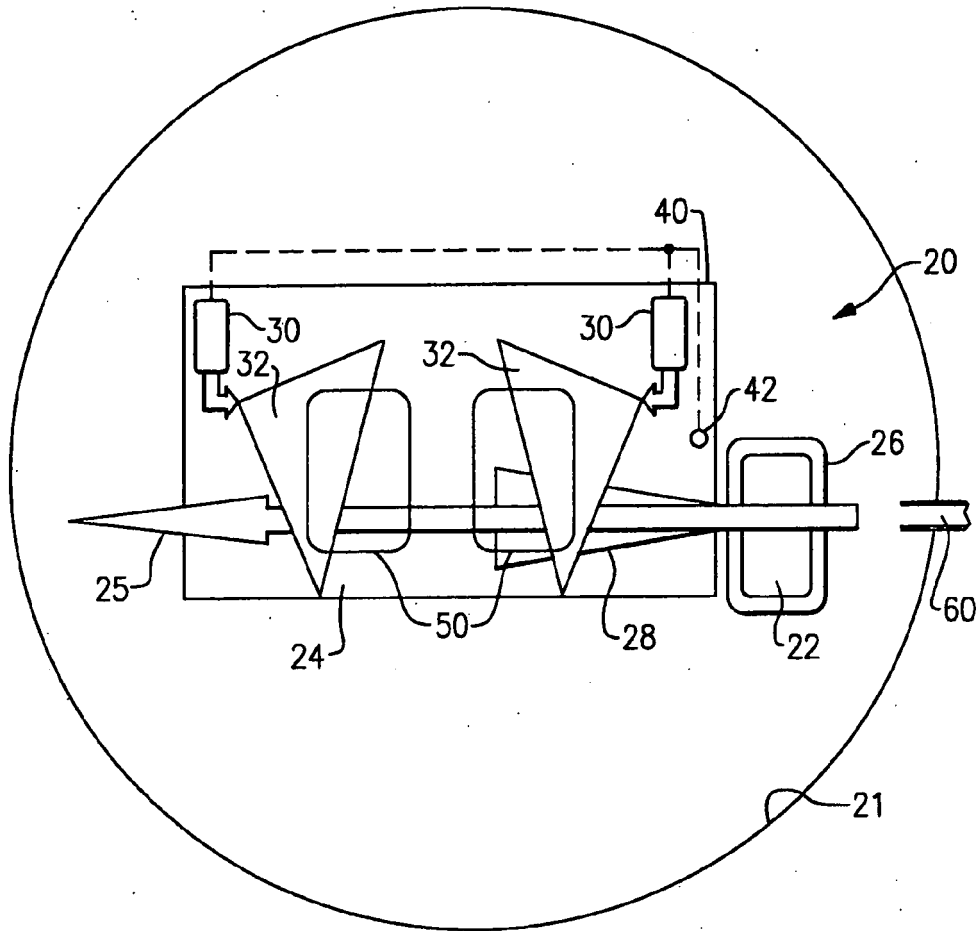


FIG. 1

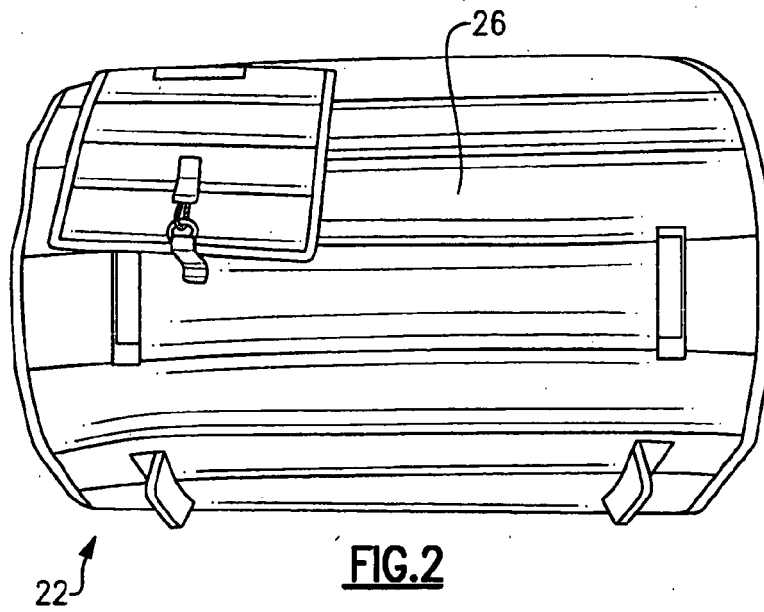


FIG. 2



EUROPEAN SEARCH REPORT

Application Number
EP 10 25 0747

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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A	----- US 2008/017392 A1 (FALLIS STEPHEN [US] ET AL) 24 January 2008 (2008-01-24) * abstract *	1-8	
Y	----- DE 10 2005 035994 A1 (GM GLOBAL TECH OPERATIONS INC [US]) 8 February 2007 (2007-02-08) * paragraph [0010] - paragraph [0016] *	1-8	
A	----- US 2008/168798 A1 (KOTLIAR IGOR K [US]) 17 July 2008 (2008-07-17) * abstract *	1-6,8	
			TECHNICAL FIELDS SEARCHED (IPC)
			A62C
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
The Hague		10 August 2010	Nehrdich, Martin
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone		T : theory or principle underlying the invention	
Y : particularly relevant if combined with another document of the same category		E : earlier patent document, but published on, or after the filing date	
A : technological background		D : document cited in the application	
O : non-written disclosure		L : document cited for other reasons	
P : intermediate document		& : member of the same patent family, corresponding document	

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EPO FORM 1503 03.82 (P/4C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 10 25 0747

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10-08-2010

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82