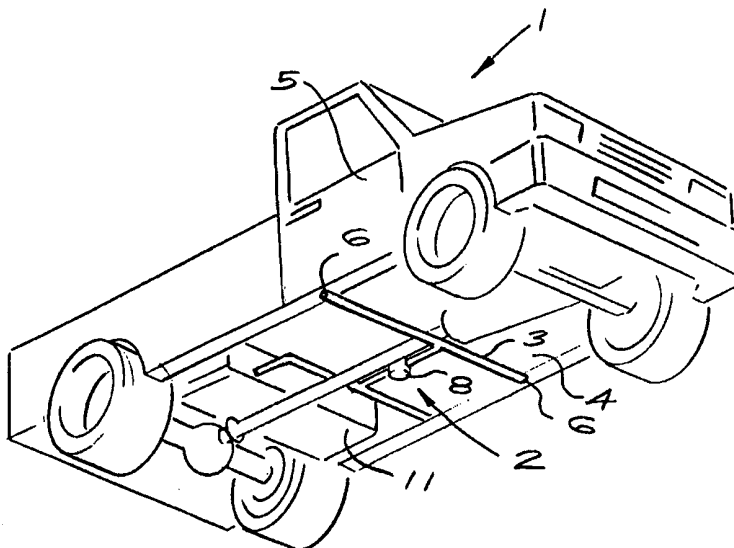


INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁶ : B60R 21/12, F41H 9/02, G08B 15/02, B60R 25/00	A1	(11) International Publication Number: WO 99/32331 (43) International Publication Date: 1 July 1999 (01.07.99)
(21) International Application Number: PCT/AP98/00012 (22) International Filing Date: 18 December 1998 (18.12.98) (30) Priority Data: 97/11416 19 December 1997 (19.12.97) ZA (71) Applicant (for all designated States except US): CHENGETA, Cuthbert [ZW/ZW]; Throgmorton House, 51 Samora Machel Avenue, Harare (ZW). (71)(72) Applicants and Inventors: FOURIE, Charl, Gregoire [ZA/ZA]; 23 Heron Street, Three Rivers East, Vereeniging, Gauteng Province (ZA). MARAIS, Eugene [ZA/ZA]; 23 Superdrive, Pretoria, Gauteng Province (ZA). (74) Agent: HONEY & BLANCKENBERG; Throgmorton House, P.O. Box 85, Harare (ZW).		(81) Designated States: AL, AM, AT, AT (Utility model), AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, CZ (Utility model), DE, DE (Utility model), DK, DK (Utility model), EE, EE (Utility model), ES, FI, FI (Utility model), GB, GE, GH, GM, HR, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SK (Utility model), SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG). Published <i>With international search report.</i> <i>Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i>

(54) Title: A SECURITY SYSTEM FOR A VEHICLE**(57) Abstract**

A security system for a vehicle is provided in which a combustible fuel is discharged through nozzles located at the side of the vehicle and ignited to cause flames. The system can make use of fuel from the fuel tank of the vehicle or can use an independent source such as LP gas.

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A SECURITY SYSTEM FOR A VEHICLE

FIELD OF THE INVENTION

This invention relates to a security system for a vehicle, more specifically to a security system which will assist in preventing vehicle hijacking.

BACKGROUND TO THE INVENTION

5 Vehicle hijackings are a serious problem in certain countries. A conventional *modus operandi* is for a hijacker to approach the vehicle from at least the driver's side and usually armed with a firearm. Conventional security devices fitted to vehicles are normally effective only once the hijacker has taken possession of the car and is sitting therein. Few security devices exist which disable the hijacker while still outside the car and in such a way that the hijacker is given little or no opportunity to shoot at the driver.

10 In this specification a "vehicle" is a commercial or passenger motor vehicle unless the context indicates otherwise.

OBJECT OF THE INVENTION

It is the object of this invention to provide a security system for a vehicle which will assist in disabling a hijacker standing next to the vehicle.

SUMMARY OF THE INVENTION

In accordance with this invention there is provided a vehicle security system comprising a pressurised fuel source with a plurality of nozzles in flow communication therewith and securable to a vehicle to discharge fuel from at least one side of the vehicle, an igniter to operatively cause ignition of fuel discharging from the nozzles and means to control the operation of the pressurised fuel source and the igniter.

Further features of the invention provide for the control means to include a switch, preferably a foot operated switch, to operate the pressurised fuel source and the igniter; for the control means to further include a code input facility to cause activation thereof; for the code input facility to include a keypad, passive transponder or remote transmitting unit; and for an impact switch to be provided to cause emergency de-activation of the security system.

Yet further features of the invention provide for the igniter to include means for generating an electric spark at the nozzles; and for the nozzles to be operatively located above or below the doors of a vehicle.

According to one aspect of the invention the pressurised fuel source includes a cylinder containing liquid propane gas (LPG).

A further feature according to this aspect of the invention provides for the cylinder to have a valve operable by the control means at the outlet thereto; and for the valve to be a solenoid valve.

According to a second aspect of the invention there is provided for the pressurised fuel source to include a pump connected to a fuel reservoir, preferably the fuel tank of a vehicle.

The invention also provides for a vehicle having a security system substantially as defined above.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will be described, by way of example only, with reference to the drawings in which:

Figure 1 is a bottom oblique view of a vehicle fitted with a first embodiment of a security device;

Figure 2 is a schematic diagram of the security system shown in Figure 1;

5 Figure 3 is a schematic diagram of a second embodiment of a security system;

Figure 4 is a bottom oblique view of the security system in Figure 3 fitted to a vehicle;

Figure 5 is a circuit diagram for an igniter used in the security system in Figure 3.

DETAILED DESCRIPTION WITH REFERENCE TO THE DRAWINGS

10 A vehicle (1), in this embodiment a light delivery vehicle or bakkie, is shown in Figure 1 and has a security system (2) fitted thereto. Referring also to Figure 2, the security system (2) has a pipe (3) running transversely of the vehicle (1) on the bottom (4) thereof and substantially central with respect to the front doors (5). The pipe (3) has a nozzle (6) at either end thereof and an inlet (7) extends
15 therefrom centrally along the length of the pipe (3). The inlet (7) forms the outlet from an electrically operated pump (8) which in turn has its inlet (9) connected to the fuel line (10) of the vehicle (1). The fuel line (10) extends in conventional fashion from the fuel tank (11) to the engine (not shown) of the vehicle (1).

20 An igniter (15) is located at each nozzle (6) outlet and these are operated through a coil (16). The pump (8) and the coil (16) are operated through a switch (17) from the battery (18) of the vehicle (1). The switch (17) is located within the interior of the vehicle (1) to be operable by a foot of the driver (not shown) of the vehicle (1).

25 In use, when a hijacker (not shown) stands along one side of the vehicle (1), the driver depresses the switch (17) twice with his foot, the first time to place the switch (17) on stand-by and the second time to cause it to operate the pump (8) and coil (16). Hereafter the pump (8) draws fuel from the fuel line (10) and projects it under pressure through the nozzles (6). The igniters (15) simultaneously create a spark at the outlet of each nozzle (6) to ignite the fuel

being projected therethrough. This causes a large flame which continues while the switch (17) is depressed. The nozzles (6) are slightly upwardly directed so that the flame is projected towards the torso of the hijacker. Also, the nozzles produce a fairly widely dispersed spray so that flame covers a fairly large area along the side of the vehicle.

It is envisaged that the security device will provide a highly effective method of disabling hijackers in the vicinity of the side of the vehicle while not causing much or any damage to the vehicle itself.

A second embodiment of a security system (30) is shown in Figure 3 and includes a cylinder (31) filled with liquid propane gas (LPG) having a control valve (32) at its outlet and connected through tubing (33) to a plurality of nozzles (34). Igniters (35) are located adjacent the nozzles (34).

Means (36) for controlling the operation of the valve (32) and the igniters (35) is provided and includes a foot operated switch (37) for activation of the system and a code input facility (38), in this embodiment a keypad, to cause activation of the control means (36). The control means (36) is also provided with an impact switch to cause de-activation of the system in the event of an accident.

Referring also to Figure 5, a high voltage generator (40) is associated with the igniters (35) to cause a continuous spark to be operatively created by the igniters (35). In this embodiment, a 14 000 volt high frequency AC potential is developed at the igniters (35) from a 12 volt DC supply essentially through the use of a step-up transformer driven by an AC signal. In this case the AC signal is generated by an integrated circuit (42) which is a basic pulse width modulation (PWM) circuit. A potentiometer (43) and resistor (44) vary the output frequency. The output from the integrated circuit (42) is amplified by MOSFETS (45) in a push-pull arrangement. The step-up transformer (46) is a standard line output transformer (LOPTI).

Each igniter (35) is located in close proximity to a nozzle to cause a continuous spark between the igniter (35) and nozzle (34) on operation of the igniter. An igniter need not be associated with each nozzle as ignition of gas at one nozzle will result in almost simultaneous ignition at adjacent nozzles.

An impact switch (39) is shown in more detail in Figure 6. As shown, the switch (39) includes plastics tube (50) which is operatively secured in an upright manner to a body part of a vehicle (not shown). A steel ball (51) is located over the upper end of the tube (50) and has a coil spring (52) secured to the part thereof covered by the tube (50). The free end of the coil spring (52) is secured to the inner surface of the tube (50) with the coil spring (52) in a slightly compressed state. A steel ring (53) extend about the ball (51) and is carried on a outwardly tapering circumferential flange (54) secured to the tube (50) partway along its length. The spring (52) and ring (53) each have an electrical cable (55,56) from the control means (36) conductively secured thereto.

In the event that the switch (39) is jarred the ball (51) becomes displaced from the end of the tube (50) and contacts the ring (53). This closes the circuit between the cables (55,56) and de-activates the entire control means (36).

Referring also to Figure 4, the security system is fitted to a motor vehicle (60) with the cylinder (31) stowed in the boot of the vehicle (30) and the nozzles located below the front doors (61). The control means can be mounted at any convenient location with the foot operated switch (37) in close proximity to the accelerator (not shown) and the code input means (38) on the dash board or console (not shown). The impact switch (39) and high voltage generator (40) will preferably be secured to the vehicle out of sight of persons in the cabin.

In use, the security system (30) must first be activated through entering a code into the keypad (38). The control means (36) will preferably be linked to the ignition of the vehicle to be de-activated once a predetermined period of time has elapsed after switching the ignition off. This will assist in preventing unauthorised and inadvertent use of the control system.

In the event of an attempted hijacking, the system can be used substantially as described with reference to the embodiment in Figures 1 and 2. The foot pedal (37) is depressed twice whereupon the control means (36) causes the solenoid valve (32) to open and shortly thereafter causes the igniters (35) to create a spark and ignite gas discharging from the nozzles (34). Once the driver removes his foot from the pedal, the solenoid valve (32) closes and the high voltage generator ceases to operate.

In the event of the vehicle (60) being involved in an accident, the impact switch is activated through the ball (51) contacting the ring (53) causing the entire security system (30) to be de-activated. This assists in avoiding inadvertent operation of the security system (30) in such events.

5 This embodiment of a security system is advantageous in that it does not rely on a pump which has more mechanical part than a solenoid valve and thus requires more maintenance. Also, LP gas ignites more readily than petrol. Furthermore, as the system is independent of the fuel system in the motor vehicle, it is easier to install and does not require modifications to be made to the existing systems.

10 Also, the rate of discharge of gas from the cylinder can easily be varied, for example by means of a needle valve, and thus the size of flames resulting from the system can be varied according to individual needs.

It will be appreciated however, that many other embodiments of a security system exist which fall within the scope of the invention especially as regards the configuration of the system and the fuel used therein. For example, the control means can include means for remote activation thereof or be linked to an anti-theft system on the vehicle. Also, by controlling the time at which the fuel is ignited and the duration of fuel discharge, a single large ignition can be created of short duration. This might prove less lethal than a continuous flame but would be
15
20 largely dependent on weather conditions, especially wind conditions for successful operation.

It is also envisaged that fuel could be discharged through nozzles from above the doors of the vehicle although it is not as easy to conceal nozzles in this configuration.

CLAIMS

1. A vehicle security system comprising a pressurised fuel source with a plurality of nozzles in flow communication therewith securable to a vehicle to discharge fuel from at least one side of the vehicle, an igniter to operatively cause ignition of fuel discharging from the nozzles and means to control the operation of the pressurised fuel source and the igniter.
5
2. A vehicle security system as claimed in claim 1 characterised in that the control means includes a switch to operate the pressurised fuel source and the igniter.
3. A vehicle security system as claimed in claim 2 characterised in that the switch is foot operated.
10
4. A vehicle security system as claimed in any one of the preceding claims characterised in that the control means includes a code input facility to cause activation thereof.
5. A vehicle security system as claimed in claim 4 characterised in that the code input facility includes a keypad.
15
6. A vehicle security system as claimed in claim 4 characterised in that the code input facility includes a passive transponder.
7. A vehicle security system as claimed in claim 4 characterised in that the code input facility includes a remote transmitting unit.
8. A vehicle security system as claimed in any one of the preceding claims characterised in that an impact switch is provided to cause emergency de-activation of the security system.
20
9. A vehicle security system as claimed in any one of the preceding claims characterised in that the igniter includes means for generating an electric spark at the nozzles.
25

10. A vehicle security system as claimed in any one of the preceding claims characterised in that the nozzles are operatively located above or below the doors of a vehicle.
- 5 11. A vehicle security system as claimed in any one of the preceding claims characterised in that the pressurised fuel source includes a cylinder containing liquid propane gas (LPG).
12. A vehicle security system as claimed in claim 11 characterised in that the cylinder has a valve operable by the control mean at the outlet thereto.
- 10 13. A vehicle security system as claimed in claim 12 characterised in that the valve is a solenoid valve.
14. A vehicle security system as claimed in any one of claims 1 to 10 characterised in that the pressurised fuel source includes a pump connected to a fuel reservoir.
- 15 15. A vehicle security system as claimed in claim 14 characterised in that the fuel reservoir is the fuel tank of a vehicle.
16. A vehicle having a security system as claimed in any one of the preceding claims.

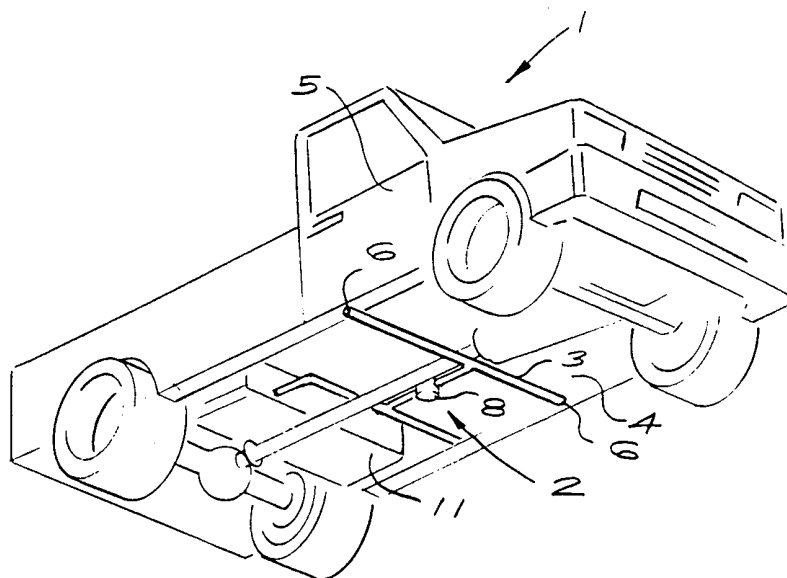


FIG. 1

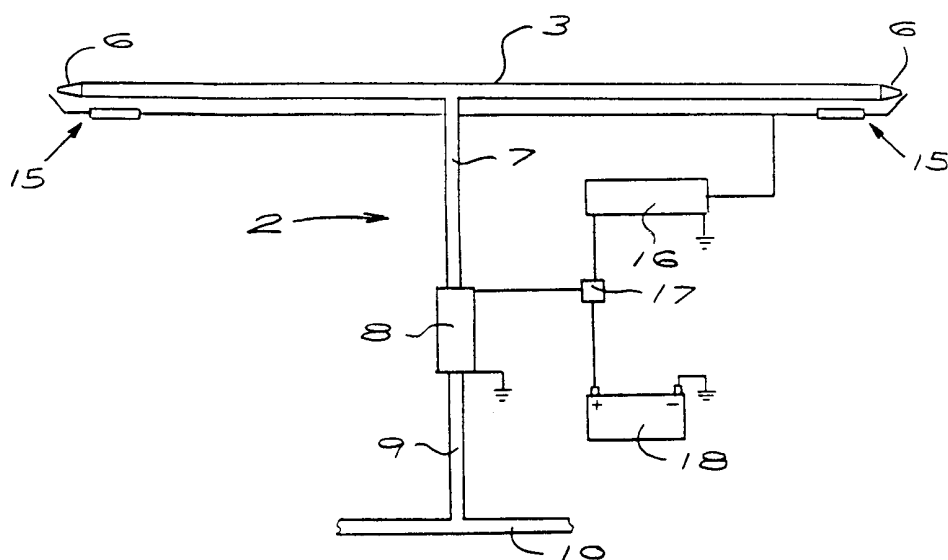
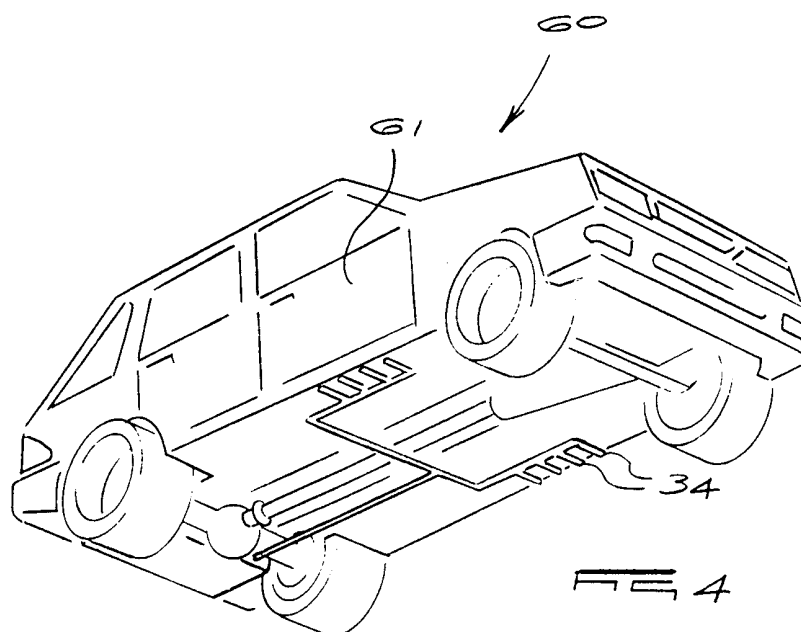
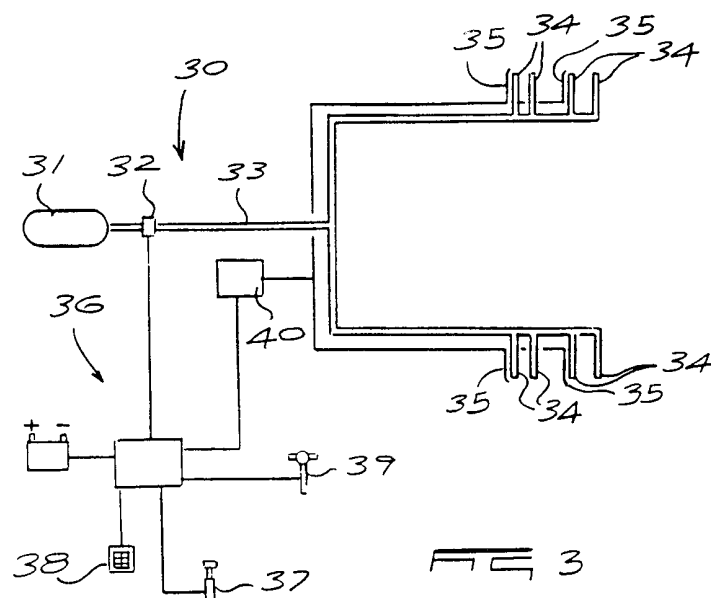


FIG. 2



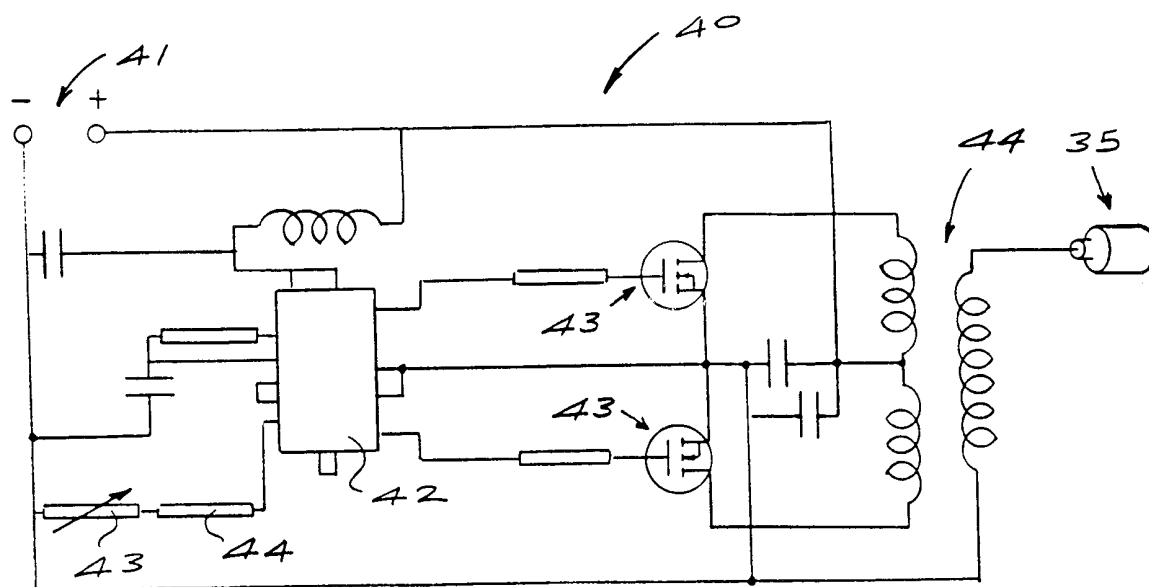


FIG 5

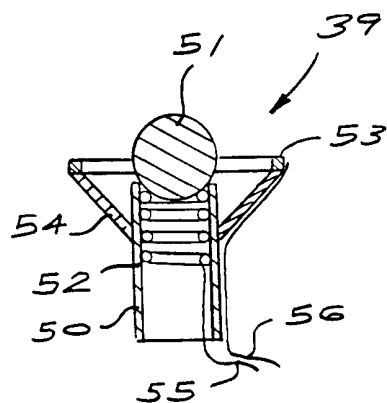


FIG 6

INTERNATIONAL SEARCH REPORT

International Application No

PCT/AP 98/00012

A. CLASSIFICATION OF SUBJECT MATTER

IPC 6 B60R21/12 F41H9/02 G08B15/02 B60R25/00

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 6 B60R F41H G08B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2 331 388 A (WARREN C. GRAHAM) 12 October 1943 see page 1, column 2, line 1 - line 9 see page 3, column 1, line 17 - line 39 see figures ---	1,16
A	WO 96 11822 A (HARGEST THOMAS S) 25 April 1996 see page 3, line 3 - line 25; figures ---	1,3,10, 16
A	HOT AND COOL, 17 November 1997, XP002098569 Available from Internet: <HTTP://WWW.KUSTOMS.COM/BBC/GARAGE/TECHGAR/EXFLAM> see the whole document --- -/--	1,16



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Patent family members are listed in annex.

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Date of the actual completion of the international search

31 March 1999

Date of mailing of the international search report

28/04/1999

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INTERNATIONAL SEARCH REPORT

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P, X	<p>FLAMETHROWER NOW AN OPTION ON S. AFRICAN CARS, 11 December 1998, XP002098570 <<a href="http://cnn.com/WORLD/africa/9812/11/flame
.thrower.car/index.html">http://cnn.com/WORLD/africa/9812/11/flame .thrower.car/index.html> see the whole document -----</p>	<p>1, 2, 9, 10, 16</p>

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2331388 A	12-10-1943	NONE	
WO 9611822 A	25-04-1996	AU 3831995 A	06-05-1996