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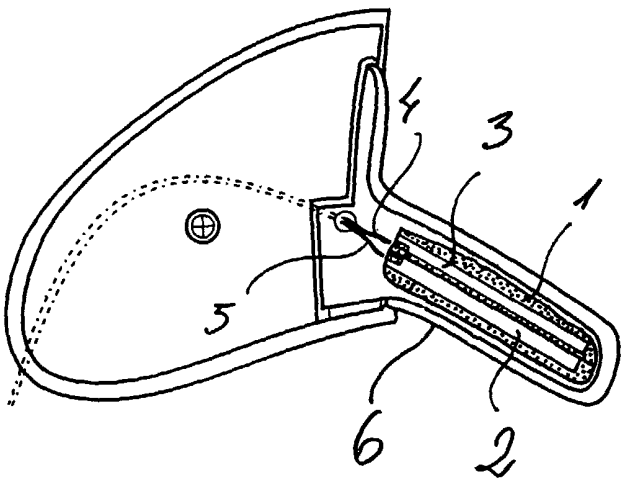
(54) Title: DEVICE AND METHOD FOR DISCHARGING STATIC ELECTRIC CHARGES



(57) Abstract: The present device eliminates electrostatic discharges when getting out of the car, exploiting the principle of transfer of the surface electric charges by difference of potential. This avoids all the problems caused by electrostatic discharges: sudden explosion of airbags, problems for people with implants of any type and general discomfort caused by said discharges.

DEVICE AND METHOD FOR DISCHARGING STATIC ELECTRIC CHARGES

Field of the invention

The present invention concerns a device and a method to prevent electrostatic charges from passing through the human body when getting out of the car and closing the door.

Background art

These charges accumulate on the surface of the car due to various causes, such as ionisation of the air caused by lightning, friction due to movement of the car through the air, friction of the various belts in the engine pulley grooves, lack of humidity in the air, CO_2 from combustion, electrical fields etc.

These charges accumulate also in persons due to friction of synthetic underwear against the body and rubbing against the car seats; said charges reach voltage values of several tens of thousands of volts.

The phenomenon is perceived when the person puts his feet on the ground and at the same time pushes the car door to close it.

At present, a device commonly sold on the market consists of a flexible strip of conducting rubber earthed to the bodywork at one end with the other end trailing along the ground.

This system does not always work, however, for various reasons.

Summary of the invention

According to an aspect of the present invention, a device is disclosed having the feature according to claim 1; according to another aspect of the present invention, a method is disclosed having the features according to claim 8.

Brief description of the figures

Further advantages of the present invention will appear more evidently to a man skilled in the art, from the following detailed description, with reference to the attached Figures, where

Figure 1 shows schematically a front view of the installation of a particular embodiment of the invention on a car door;

Figure 2 shows schematically the detail of the zone A of Figure 1, with the device of Figure 1 installed on the door opening handle;

Figure 3 shows schematically the detail of zone B of Figure 1, with the installation

of the battery of the device of Figure 1;

Figure 4 shows an exploded schematic view of the battery and its housing, in the device of Figure 1.

Detailed description of the invention

According to a preferred embodiment of the present invention, described as a non limiting example, the discharging device can consist of two copper tracks 1,2 on a flat rectangular strip of mylar 3, insulated from each other and at a distance for example of two millimetres; for example, the dimensions of this flat strip 3 can be two centimetres by seven and the back of the strip is adhesive. Two thin flexible copper conductors 4,5 insulated in sheaths, length approximately one metre, are welded at the ends of the two metal tracks 1,2.

The flat strip 3 can be cut with a pair of scissors to adapt it to the size and shape of the inside car door opening handle 6. Having removed the protective film of the adhesive, it is glued to the handle 6 so that every time the door is opened to get out of the car, the person's fingers come simultaneously into contact with the two copper tracks 1,2.

If there are electrostatic charges on the person's body, they will be discharged along the conductors 4,5, whether positive or negative.

The electrostatic charges are eliminated as they are transferred as soon as they are produced.

These copper conductors 4,5 pass inside the door panel and come out near the hinges where other cables are generally conveyed. The ends of these conductors 4,5, stripped of the insulating sheath for a stretch of approximately 30 millimetres, will be connected to the poles of a small 3 volt battery 7 –or a battery of any suitable voltage- positioned in a container 8. This container 8 has a spongy adhesive support 9 so that it can be easily glued onto the door wing and simultaneously keep two portions of conductors 4,5 (at a distance from each other) permanently in contact with the car door paint, before connection to the battery poles; this way the 3 volt battery 7 and the conductors 4,5 realize an electric circuit not grounded with the car iron body or the earth itself. The 3 volts battery 7 then disperses the electrostatic charges it accumulates because of the air humidity, oxydation processes and the other factors which usually cause a battery

discharge. The electric resistance of the car paint avoid that the two stripped conductor parts are short-circuited, and the distance between the stripped connectors will be accordingly determined to avoid short-circuits as well.

In this way the electrostatic charges from the outside surface of the car (whether positive or negative) move along the conductors 4,5 and discharge onto the battery 7, due to difference in potential. This system can be used on all cars manufactured up to now and the same principle can be simply and inexpensively applied during manufacture of new cars, by connecting the conductors 4,5 to the car battery and providing a purposely-made handle.

In this case, advantageously one conductor 4 is connected to the ground battery pole, and the other conductor 5 is connected to the positive battery pole.

This system should help to solve problems such as sudden explosion of airbags, faulty operation of electronic control units and various devices on the car, hazards for people with pace-makers, eyes and ears with artificial parts, problems for people with any type of metal prosthesis and general discomfort for everyone caused by the phenomenon.

The above described device can be modified in several ways without departing from the present invention: generally, the copper conductors 1,2, or whatever conductive track, can be fixed to other parts 6 of a passenger compartment, and not necessarily on the passenger compartment side of the doors, or even on other parts outside the passenger compartment; the conductors 4,5 can be electrically connected to any suitable capacitive bipolar element 7, where capacitive bipolar element 7 means every electric component having suitable electric capacity, like for example a capacitor; likewise the stripped parts of the conductors 4,5 can be set in contact with the paint in other points of the body which are not necessarily the passenger compartment side of the doors; the strip of mylar 3 can be alternatively any other suitable support. Further modifications, obvious for a man skilled in the art, are of course possible.

CLAIMS

1. Device for discharging static electric charges to be installed on a vehicle, characterised in that it comprises at least two electric conductors (4,5) each of which comprises a non-insulated part (1,2) suitable to be set on a part (6) of the passenger compartment of said vehicle, and positioned in such a way one with respect to the other that a passenger, while grasping said part (6), grasps both of said at least non-insulated parts (1,2), and said at least two electric conductors (4,5) are also connected each of them to a pole of a capacitive bipolar element (7).

2. Device according to claim 1, characterised in that said capacitive bipolar element (7) comprises either a storage cell or a capacitor.

3. Device according to claim 1, characterised in that said at least two electric conductors (4,5) are electrically connected each of them to a different point of the bodywork coating.

4. Device according to claim 2, characterised in that said storage cell (7) consists essentially of the vehicle battery.

5. Device according to claim 4, characterised in that one of said at least two conductors (4,5) is connectable to the positive battery pole, and the other of said at least two conductors (4,5) is connectable to a vehicle ground pole.

6. Device according to claim 2, characterised in that said storage cell (7) comprises a battery suitable to be electrically insulated from the earth or the vehicle iron body.

7. Device according to claim 1, characterised in that each of said non-insulated parts (1,2) comprises a flat support (3) with electrically conductive tracks.

8. Method for discharging electric charges from a vehicle, comprising the step of setting the non insulated parts (1,2) of at least two different electric conductors (4,5), not short circuited with each other, on a predetermined part (6) of a vehicle passenger compartment, in such a position one with respect to the other that a passenger, while grasping said part (6) of the passenger compartment, grasps both of said at least two non-insulated parts (1,2), and the step of connecting each of said at least two electric conductors (4,5) to a pole of a capacitive bipolar element (7).

9. Method according to claim 8, characterised in that said part (6) of the passenger

compartment belongs to a door.

10. Method according to claim 8, characterised in that said part (6) is either a door handle or a door lever.

11. Method according to claim 8, characterised in that each of said conductors (4,5) are in electrical contact with the bodywork coating.

12, Method according to claim 8, characterised in that one of said at least two conductors (4,5) is connected to the positive vehicle battery pole, and the other of said at least two conductors (4,5) is electrically connected to a vehicle iron body pole.

13. Method according to claim 8, characterised in that said at least two conductors (4,5) are connected to the poles of a storage cell (7) electrically insulated from the earth or the vehicle iron body.

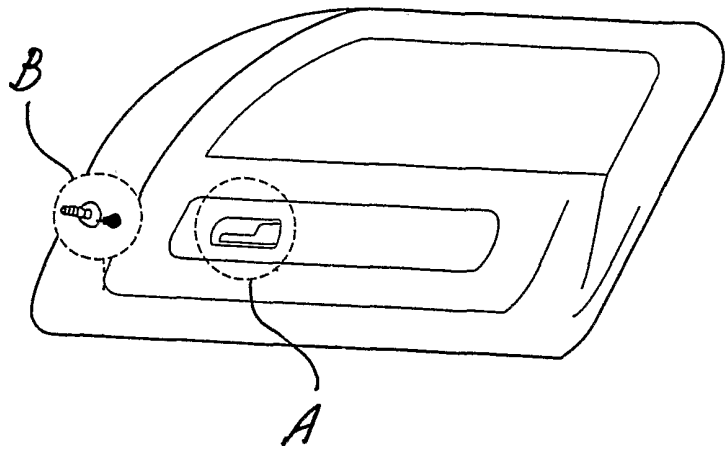


Fig. 1

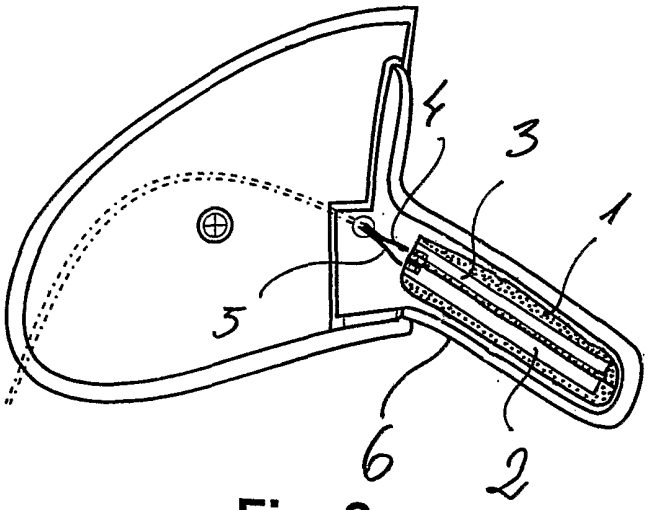


Fig. 2

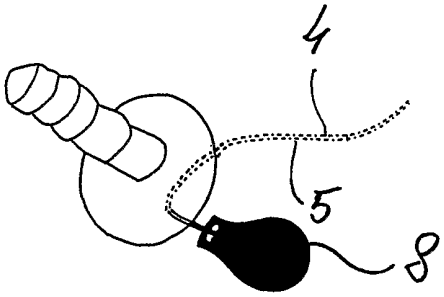


Fig. 3

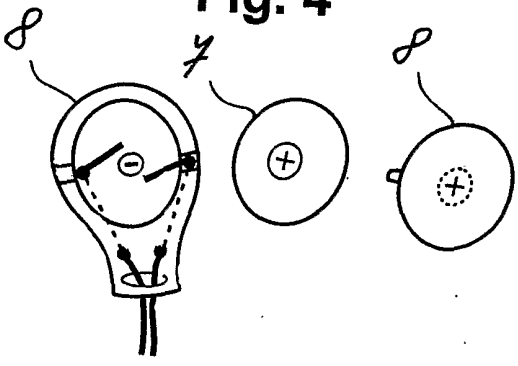


Fig. 4

INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 B60R16/06

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 7 B60R H05F

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)
PAJ, EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5 179 497 A (BAKHOUM EZZAT G) 12 January 1993 (1993-01-12) the whole document ---	1-13
Y	GB 2 322 839 A (SAUL MARTIN KINROSS) 9 September 1998 (1998-09-09) the whole document ---	1-13
Y	WO 92 20201 A (BAKHOUM EZZAT G) 12 November 1992 (1992-11-12) page 4, line 1 - line 22 page 7, line 6 -page 9, line 28 page 13, line 1 - line 20; figures 1-4 --- -/--	1-13

[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
16 November 2001	22/11/2001

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Geyer, J-L

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INTERNATIONAL SEARCH REPORT

International Application No
PCT/EP 01/08187

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication,where appropriate, of the relevant passages	Relevant to claim No.
Y	PATENT ABSTRACTS OF JAPAN vol. 010, no. 151 (M-483), 31 May 1986 (1986-05-31) & JP 61 006049 A (TAKAAKI IIDA), 11 January 1986 (1986-01-11) abstract	1-13
A	PATENT ABSTRACTS OF JAPAN vol. 1997, no. 01, 31 January 1997 (1997-01-31) & JP 08 227797 A (IO KAZUAKI;IOU SAYOKO; IO SHIRO; IO TAKESHI), 3 September 1996 (1996-09-03) abstract	1-11
A	DE 197 45 869 A (VOLKSWAGENWERK AG) 7 May 1998 (1998-05-07) the whole document	1,3,5, 7-11
A	DE 36 06 975 A (BAHLINGER WALTER;AMANN HUGO) 10 September 1987 (1987-09-10) the whole document	1,3,5, 7-11

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
PCT/EP 01/08187

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5179497 A	12-01-1993	WO 9220201 A1	12-11-1992
		US 5300889 A	05-04-1994
		US 5247420 A	21-09-1993
GB 2322839 A	09-09-1998	NONE	
WO 9220201 A	12-11-1992	WO 9220201 A1	12-11-1992
		US 5300889 A	05-04-1994
		US 5179497 A	12-01-1993
		US 5247420 A	21-09-1993
JP 61006049 A	11-01-1986	NONE	
JP 08227797 A	03-09-1996	NONE	
DE 19745869 A	07-05-1998	DE 19745869 A1	07-05-1998
DE 3606975 A	10-09-1987	DE 3606975 A1	10-09-1987