This invention relates generally to static electricity discharge devices and more particularly to a novel device making use of resistors for harmlessly discharging accumulated static electricity.

Most persons have, at some time or other, experienced the annoyance of getting shocked when, after accumulating a static electric charge due to friction, they contacted a metallic object such as appliances, door handles, light switch plates, etc. Although the shock experienced is certainly more annoying than harmful, it is desirable to provide devices for eliminating discharge.

In view of the above, the applicant has provided a pair of discharge devices which utilize a resistor in a manner such that the discharge is effected across the resistor so as to eliminate the shocking effect on the individual. A first form of the invention disclosed includes an adhesive element which secures the embodiment to a metallic element. This embodiment is particularly adapted for utilization in an automobile for discharging the static electricity accumulated by a person through friction with the automobile seats. A resistor is supported by the adhesive member normally out of engagement with the metallic element. Aligned apertures are provided in the members adjacent the resistor so as to allow the resistor to be flexed so as to bring it into contact with the metallic element for discharging the accumulated static electricity therefrom.

The second embodiment of the invention makes use of a device designed to be carried by an ordinary key chain and includes a resistor embedded in an insulative body and connected between end caps which are conductive. By gripping a first of the end caps between the fingers and engaging the second end cap with a metallic element as a door handle, the accumulated charge, as caused by friction with carpets, is discharged through the resistor.

It is the principal object of this invention therefore to provide static discharge devices of a novel construction which may be easily utilized and inexpensively manufactured.

It is a still further object of this invention to provide a pair of novel static discharge device constructions which utilize high resistive elements for dissipating electrical energy resulting from acrostatical voltages.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals of the several views refer to the same parts throughout, and in which:

FIGURE 1 is a fragmentary perspective view of the first embodiment of the invention illustrating the discharge device adhered to a metallic portion of an automobile door;

FIGURE 2 is a disassembled perspective view of the various portions of the discharge device;

FIGURE 3 is an enlarged horizontal sectional view taken substantially on the plane 3-3 of FIGURE 1;

FIGURE 4 is a perspective view of a second form of static discharge device;

FIGURE 5 is a vertical sectional view taken substantially along the plane 5-5 of FIGURE 4; and

FIGURE 6 is an elevational view of a blank which may be utilized in the formation of the embodiment of FIGURES 4 and 5.

With continuing reference to the drawings and initial reference to the embodiment illustrated in FIGURES 1—3, numeral 10 generally represents the discharge device adapted to be secured to a metallic or conductive grounding body 12, which is illustrated as being a portion of a conventional automobile door. As noted above, it is desired to discharge or dissipate energy in a resistor, the high electrostatical voltages built up in a person's body by friction, as caused by sliding across the automobile seat. The discharge device 10 includes initially, a flat insulator 14 provided with an adhesive 16 on one side thereof. The particular adhesive utilized is not critical and the insulator 14 may in fact be any type of adhesive tape which is flexible, non-conductive, and of medium tensile strength. It is, of course, necessary for the adhesive 16 to have sufficient adhesive strength. It will be realized that the insulator 14 may be made of any of various colors or may be transparent. The insulator 14 is provided with a central aperture 18.

Adapted to be supported adjacent the insulator 14 is a sponge rubber or plastic pad 20 which is also flat and which may be slightly thicker than the insulator 14. The properties required of the pad 20 is that it must be resilient so that it will return to its original shape after being depressed. The pad 20 is likewise provided with a central aperture 22 which is adapted to be aligned with the aforementioned aperture 18.

Adapted to be supported adjacent the pad 20 is a resistance element 24 which may be any type resistor having a flat contour where the resistance is between the top and bottom surfaces 26 and 28. The resistance element 24 may be, for example, carbon, film, or wire wound, etc. The particular resistance value thereof is not critical and the choice is one that should be determined by economic and production consideration. However, it has been found that a resistance element having a resistance of 10,000 ohms between the surfaces 26 and 28 normally performs in the desired manner.

An insulator 30 is provided which is identical to the insulator 14. The insulator 30 likewise has an adhesive 32 formed on one side thereof and a central aperture 34 defined therein. With particular reference to FIGURE 3, the assembly of the discharge device and utilization thereof will be appreciated. The insulators 14 and 30 are adhered to each other with the adhesive 32 engaging the surface of the insulator 14 remote from the adhesive 16. The adhesive 16 of insulator 14 is engaged with the conductive grounding body 12. The apertures 34 and 18 are in alignment.

Between the insulators 30 and 14 is received the pad 20 with the aperture 22 provided therein also aligned with the apertures 18 and 34 forming a protective insulating mounting. The resistance element 24 is received between the insulator 30 and the pad 20. The resistance element 24 is therefore normally spaced from the conductive surface 12 but exposed through the aligned openings 18, 22 and 34. The element 24 is made so as to be slightly flexible. Accordingly, in order for a person to discharge accumulated electrostatic voltage through the resistance element 24, it is merely necessary for him to engage the element 24 through the aperture 34 and depress the element 24 through the apertures 22 and 18 such that the element 24 comes into electrical contact with the conductive body 12. The high resistance of the resistance element 24 will then dissipate the acquired electrical energy and no shock will be felt by the person.

Attention is now called to the embodiment of the invention illustrated in FIGURES 4—6. This particular embodiment is provided principally for the purpose of carrying on an ordinary key chain whereby it will be readily available for engagement with metallic door handles for dissipating electrical energy accumulated by walking along a carpeted hallway. The device is gen-
generally designated by the numeral 50 and includes an ordinary resistance element 52 having leads 54 and 56 extending therefrom. Again it is preferable that the resistance value be approximately 10,000 ohms. The resistance element should be cylindrical as indicated. The element 52 is embedded in an insulative material 58, as Bakelite or such forming a pocket for the element 52 and aligned bores through which the leads 54 and 56 extend as shown in FIGURE 5. Insulative material 58 also mounts a first end cap 60 secured thereto. The end cap 60 may be formed from the blank 62 illustrated in FIGURE 6. Openings 64 and 66 are provided which may be aligned when the end cap 60 is rolled about insulator 58. By depressing the end cap 60 in insulator 58 as indicated for example at 68, the end cap 60 is secured to the insulator 58. The lead 54 is then electrically connected to the end cap 60 as by soldering. In like manner, a second end cap 70 is secured to the lower end of the insulator 58 with the lead 56 being soldered thereto. A ring 72 may be fitted through the openings 64 and 66 with an ordinary key chain 74 being passed therethrough.

In use, a person with accumulated charge will be conductively exposed to the resistance element by gripping the end cap 60 and to engage the end cap 70 with the conductive grounding body of the door handle. By doing this, the accumulated electrical energy is dissipated in the resistance element 52, thus preventing that person from getting shocked and also protecting the equipment being touched. A typical use of this item could be made by photographers using flash bulbs. Electrostatic voltages can cause these bulbs to explode when touched and can lead to severe burns or fragmentation injuries. By touching the end cap 70 to the metallic base of a flash bulb, the energy will be dissipated in the resistor and prevent this from happening. Numerous other uses of the discharge devices will be apparent.

From the foregoing, it should be realized that a pair of novel constructional devices have been formed for the purpose of easily discharging accumulated electrical energy. The device may be manufactured inexpensively and may be conveniently installed and carried.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

1. A shock eliminator particularly designed for dissipating electrical energy resulting from acquired electrostatic voltages between persons and conductive bodies comprising, a high resistance element, insulative means supporting said resistance element proximate to and electrically insulated from the conductive body, and means operatively connected to said element and mounted by said insulative means for selectively, electrically connecting said element to the body for dissipating said energy across said element, said insulative means including a plurality of flat insulators mounting said elements therebetween, one of said flat insulators provided with an adhesive for securing said shock eliminator to said body, said resistance element being flat and flexible, and aligned apertures are defined in said flat insulators exposing said flexible resistance element for projection therethrough to engage said body.

2. The combination of claim 1, including resilient means carried between said plurality of flat insulators and disposed between said body and said element for resiliently spacing said element from said body.

3. A device for eliminating electrostatic shock comprising, insulation mounting means, electrical resistance means mounted in protective relation within the mounting means, means disposed in the mounting means for conductively and restrictively exposing the resistance means to a person and a conductive grounding body for selective electrical connection of the resistance means between the person and the body to safely dissipate electrostatic energy accumulated within the person, said mounting means comprising a pair of flexible adhesive strips adhering to each other and to the grounding body at opposite end portions thereof, and resilient spacing means disposed between central portions of said strips for resiliently spacing the resistance means from the grounding body.

4. The combination of claim 3, wherein said means for conductively exposing the resistance means comprises aligned openings formed in the mounting means through which the resistance means is exposed for actuation into electrical contact with the grounding body.

5. A device for eliminating electrostatic shock comprising, insulation mounting means, electrical resistance means mounted in protective relation within the mounting means, means disposed in the mounting means for conductively and restrictively exposing the resistance means to a person and a conductive grounding body for selective electrical connection of the resistance means between the person and the body to safely dissipate electrostatic energy accumulated within the person, means for conductively exposing the resistance means comprising aligned openings formed in the mounting means through which the resistance means is exposed for actuation into electrical contact with the grounding body.

References Cited in the file of this patent

UNITED STATES PATENTS

2,302,003 Cadwell ------------ Nov. 17, 1942
2,325,414 McChesney ---------------- July 27, 1943
2,614,155 Lippy ------------------- Oct. 14, 1952
2,751,523 Adams -------------- June 19, 1956
2,785,344 Hines --------------- Mar. 12, 1957
2,802,148 Alder ---------------- Aug. 6, 1957