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N. K. MILLER

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SAFETY EDGE FOR HANGAR DOOR

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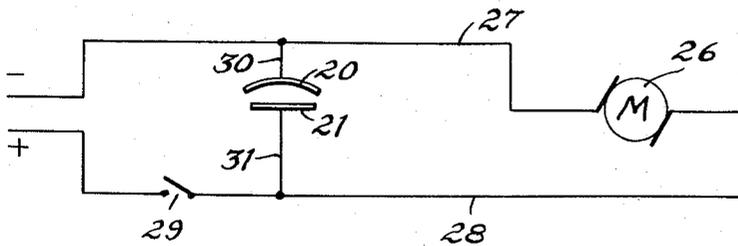
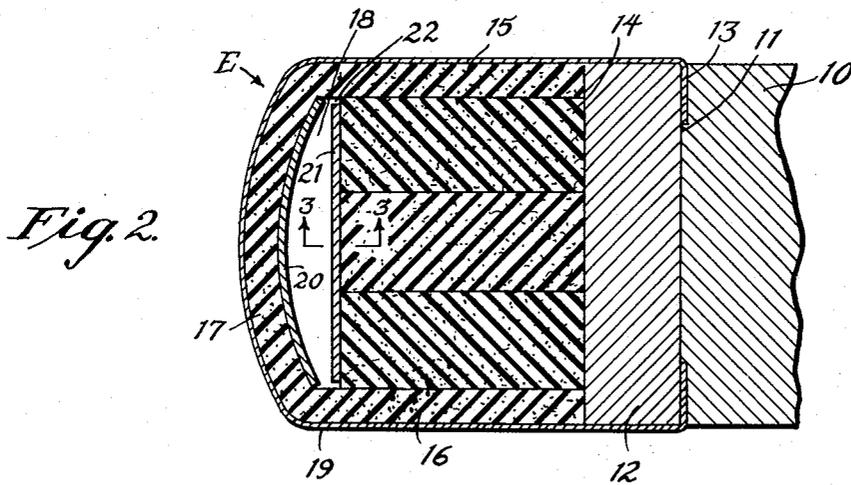
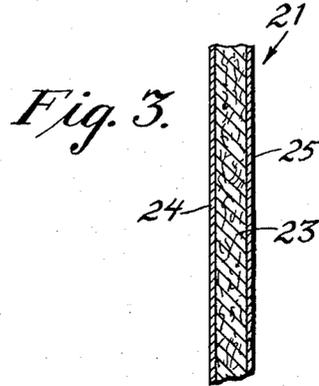
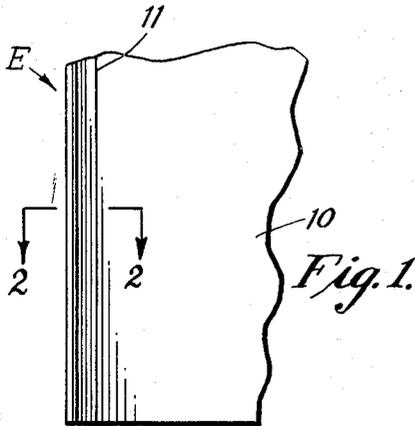


Fig. 4.

INVENTOR.
NORMAN K. MILLER
BY *John A. Robertson*
ATTORNEY.

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SAFETY EDGE FOR HANGAR DOOR

Norman K. Miller, Philadelphia, Pa., assignor to Miller Brothers, Upper Darby, Pa., a partnership

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5 Claims. (Cl. 200—61.43)

The present invention relates to doors of the type which are motor driven and is concerned primarily with the so-called "safety edge" of such a door.

At the present time, comparatively huge and massive doors, such as are included in aircraft hangars, factories, warehouses and similar places, are motor driven. That is, a motor is employed to move the door into and out of its closed position.

It is evident that such a door, moving under power, constitutes a hazard which is likely to result in either personal injury or property damage, if either a person or some article should get into its path of movement. Those dealing with this particular problem have recognized its dangerous characteristics and attempt has been made to provide a safety edge for the door which will reduce or eliminate the hazard.

The now known safety edge comprises a strip of relatively stiff and heavy material which is attached to the edge of the door, in the shape of an arch. This strip, together with the door edge, presents confronting faces, on which are provided electrical contact elements in the form of a wire mesh or screen. The theory behind such a door is that when the edge, as defined by the curved leather strip, strikes some object in the path of movement of the door, an electrical contact is made which disables the motor that moves the door and thus brings the door to a stop.

The device above described present certain disadvantages which are intended to be overcome by the present invention.

In the first instance, the wire mesh or screen becomes worn and frayed, whereupon ends of the wire upstand and create an electrical contact at unwanted times. Then again, the safety edge does not have sensitivity to the degree required under the circumstances of actual usage, and as a practical matter, it has been found that the safety edge will function only when it engages an object squarely in the path of the door. Thus, it is only when the topping force is substantially in line with the path of movement that the safety edge is rendered effective.

With the foregoing conditions in mind, the present invention has in view as its foremost objective, the provision of a safety edge for motor driven doors of the character indicated, which is highly sensitive, capable of stopping the motor even when objects are engaged at an angle and which includes new and improved contact elements which are not impaired by long service usage.

More in detail, the invention has as an object the provision of a safety edge, of the type aforesaid which consists essentially of cooperating elements of foam rubber which are mounted on the edge of the door in spaced relation to present confronting surfaces which are covered by improved contact elements. In carrying out this idea, one element of foam rubber, which for the purposes of this specification is called the base, is mounted directly on the door edge. Cooperating with the base is a second foam rubber element of U-shaped cross section which encloses the base and which has a curved or

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arched back that is spaced from the confronting face of the base. The electric contact elements are provided on the exposed faces of the base and the curved innerface of the back respectively.

5 Still another object in view, is to provide a safety edge structure of the character indicated which includes electrical contact elements, each of which comprises a laminated strip made up of an inner layer of asbestos which is covered by an appropriate metallic foil, such as aluminum.

10 Yet another object of the invention is to provide a safety edge of the type noted, in which the cooperating foam rubber elements are maintained assembled on the door edge by an appropriate fabric casing.

15 Various other more detailed objects and advantages of the invention, such as arise in connection with carrying out the above noted ideas in a practical embodiment, will in part become apparent and in part be hereinafter stated as the description of the invention proceeds.

20 The invention, therefore, comprises a safety edge for motor driven doors which consists essentially of cooperating foam rubber elements presenting confronting faces in spaced relation with the faces being covered by electric contact elements in the form of asbestos strips covered with metallic foil, and a fabric casing which assembles the foam rubber elements on the door edge.

25 For a full and more complete understanding of the invention, reference may be had to the following description and accompanying drawing, wherein:

30 Figure 1 is a fragmentary view in elevation of a portion of a hangar door which is provided with a safety edge designed in accordance with the precepts of this invention.

35 Figure 2 is a detailed horizontal section taken on an enlarged scale and about on the plane represented by the line 2—2 of Figure 1.

40 Figure 3 is another sectional view taken on an enlarged scale, through one of the contact strips and about on the plane represented by the line 3—3 of Figure 2; and

45 Figure 4 is a wiring diagram of an electrical circuit which includes the contact elements of the safety edge of this invention.

Referring now to the drawing, wherein like reference characters denote corresponding parts, and first more particularly to Figures 1 and 2, a portion of a door such as a hangar door is therein illustrated and identified by the reference character 10. It is to be understood that this door 10 is typical of any door which is motor driven. The main body portion of the door 10 includes an edge represented at 11 which is intended to carry the safety edge of this invention. This safety edge is referred to in its entirety by the reference character E.

55 The safety edge E comprises a mounting strip 12 which may be of any appropriate material such as that from which the door proper 10 is made and which is secured along the edge 11, leaving spaces 13 on the opposite faces of the door, for a purpose to be later described. Carried by the mounting strip 12 is a base 14 of foam rubber. This base 14 is generally of rectangular cross section and is somewhat narrower than the mounted strip 12. It may consist of a single piece of foam rubber or it may be a laminated structure such as the three pieces illustrated in Figure 2.

60 Cooperating with the base 14 is a channel member of U-shaped cross section, comprising side walls 15 and 16 and a back 17. The walls 15 and 16 and back 17, are preferably integrally joined as a one-piece affair and the back 17 is arched or curved, as shown in Figure 2, to provide a space 18 between the back 17 and the base 14.

70 A fabric casing is shown at 19 and may be of any suitable material, although the invention has particularly in

mind the use of vinyl coated nylon as the material from which the casing 19 is made. This casing 19 passes over the channel member with the base assembled therein, with the end edge portions being clamped in the recesses 13. The inner face of the curved back 17 of the channel member is covered by an electric contact strip, represented at 20. This strip 20 substantially covers the curved inner face of the back 17. The second contact strip 21 covers the exposed face of the base 14, leaving narrow edge portions at 22 which are uncovered.

Referring now more particularly to Figure 3, the detailed construction of the contact strips 20 and 21 will be described. Both of these contact strips are of the same construction and comprise an asbestos core 23 opposite faces of which are covered by a metallic foil, such as aluminium foil which is represented at 24 and 25.

Operation

While the mode of operation of the safety edge above described is believed to be obvious from the illustration of the drawing and description of parts given, it may be briefly outlined as follows:

It will be first understood that the contact strips 20 and 21 are included in an appropriate electric circuit so that when any parts of these contact strips are brought into engagement with one another, a circuit is completed which will disable the motor that moves the door 10.

Figure 4 is illustrative of one circuit which may be employed, although it is to be clearly understood that this circuit is not a limitation on the invention.

The motor which moves the door is represented at 26. It is connected by lines 27 and 28, with an appropriate power source. A control switch 29 is shown for the purpose of energizing the motor as occasion demands. The contact strips 20 is shown as connected to the line 27 by line 30, while the contact strip 21 is connected to line 28 by another line 31. It is evident that when any portion of the strips 20 and 21 are brought into engagement with each other, the motor 26 will be short-circuited. The contact strips 20 and 21 could just as well be included in a circuit having a relay which controls the motor 26 and which relay would be energized by engagement of the strips 20 and 21 to open the circuit to the motor.

It is evident that when any portion of arched back 17 engages any object in the path of movement of the door, either human or otherwise, and at any angle, the strips 20 and 21 will be brought into engagement to disable the motor 26.

The device is highly sensitive, because of the flexible and resilient characteristics of foam rubber, and this sensitivity is controlled by the size of the space or gap 18.

Obviously the various parts will be dimensioned, to accommodate the conditions of any particular installation so that the thicknesses of the foam rubber and the space 18 will provide the sensitivity required.

While a preferred specific embodiment of the invention is hereinbefore set forth it is to be clearly understood that the invention is not to be limited to the exact constructions, designs, and materials illustrated and described because various modifications of these details may be provided in putting the invention into practice within the purview of the appended claims.

What is claimed is:

1. In a safety edge for a motor driven door, a base member of foam rubber, a channel member of foam rubber enclosing said base member and having a curved back, said members presenting confronting faces in spaced relation, and a contact strip on each of said faces.

2. In a safety edge for a motor driven door, a mounting strip adapted to be secured to the edge of a door, a base member of foam rubber carried by said mounting strip and having a width less than that of the mounting strip, a U-shaped channel member of foam rubber having side walls engaging said base member and a curved back, said back and base member having confronting faces in spaced relation, and contact strips covering said confronting faces.

3. In a safety edge for a motor driven door a base member of foam rubber having a substantially rectangular cross section and an exposed face, a contact strip on said exposed face leaving uncovered margins at either side thereof, a U-shaped channel member of foam rubber having side walls engaging said base member and an arched back having a curved inner face spaced from said channel member and a contact strip fully covering said curved inner face of said back.

4. In a safety edge for a motor driven door, a mounting strip, a base member of foam rubber carried by said mounting strip, a U-shaped channel member of foam rubber receiving said base member and having a curved back spaced from the base member, said back and base member presenting confronting faces in spaced relation, contact strips on said confronting faces, and a fabric casing enclosing said channel member and assembling said channel member with the base member therein on said mounting strip.

5. In a safety edge for a motor driven door, cooperating elements of foam rubber presenting confronting faces in spaced relation, and contact strips on said faces, each of said contact strips comprising an asbestos core covered by metallic foil.

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