United States Patent [19]

Miller

[11] **3,896,590**

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[54] **DOOR SAFETY EDGE CONSTRUCTION**

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[73] Assignee: **Miller Brothers,** Concordville, Pa.

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[52] **U.S. Cl.** **49/488;** 49/27; 49/489; 200/61.43

[51] **Int. Cl.**[2] **E06B 7/16;** H01H 3/16

[58] **Field of Search** 49/488, 489, 27, 28, 469; 200/61.43, 61.73

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Attorney, Agent, or Firm—Robert K. Youtie

[57] **ABSTRACT**

A safety edge construction for a door including an edge plate coextensive with a door edge and having one surface facing away from the door, the edge plate being formed in its outer surface with an undercut longitudinal groove, a pressure sensitive inner body extending along the groove, and a stiff flexible attachment member secured to the body and having a rib conformably engaged in the groove for retention of the body against separation from the plate.

6 Claims, 12 Drawing Figures

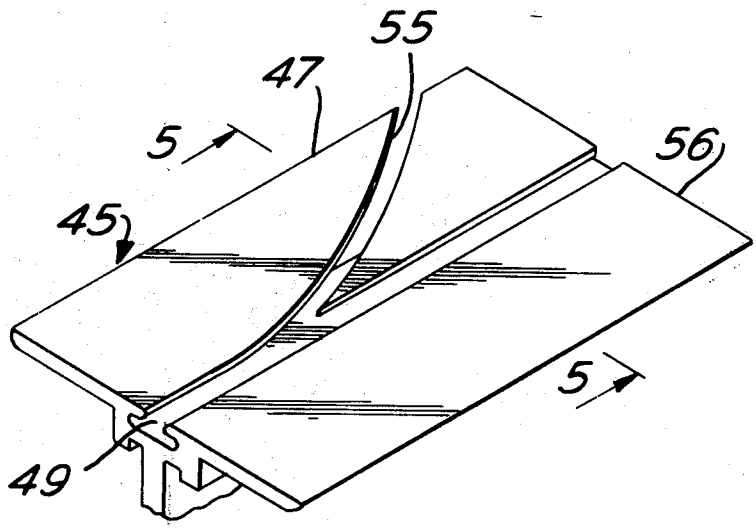


FIG. 1

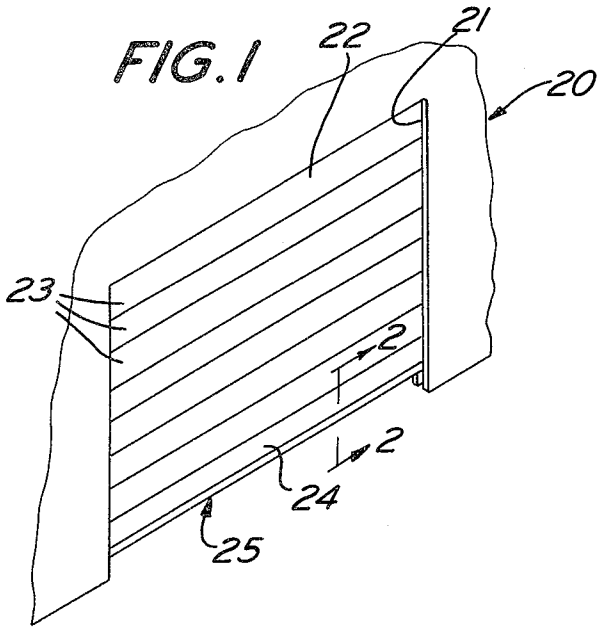
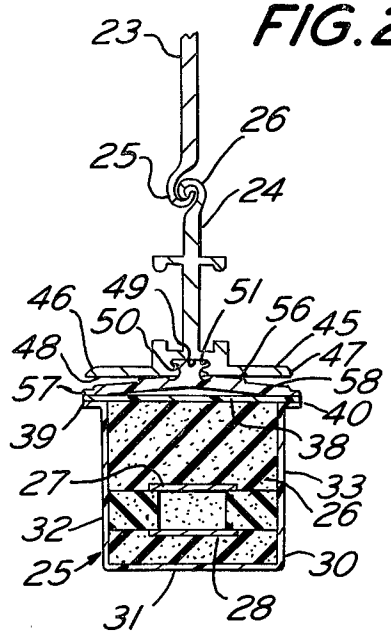


FIG. 2



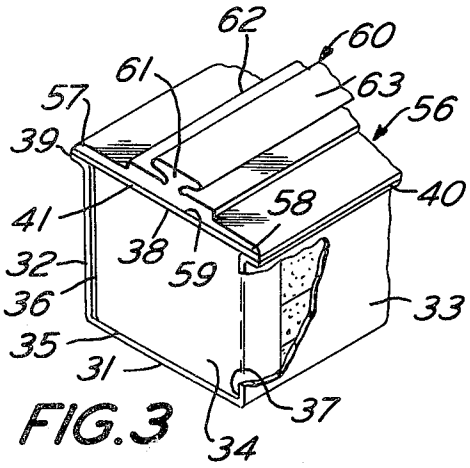
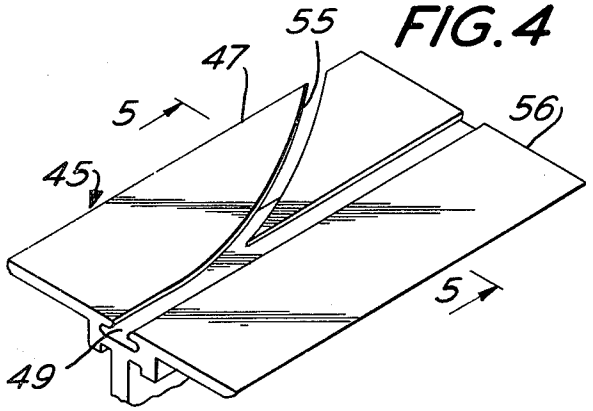


FIG. 3

FIG. 4



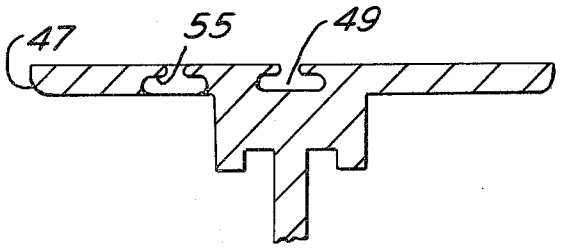


FIG. 5

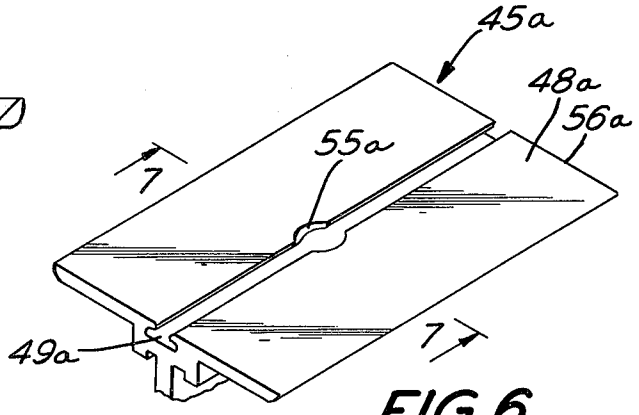


FIG. 6

FIG. 7

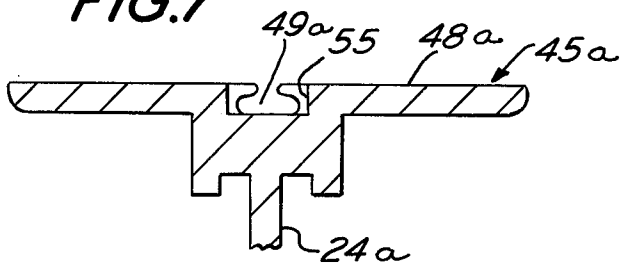


FIG. 8

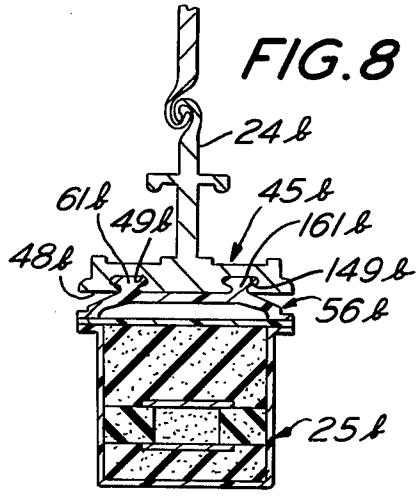
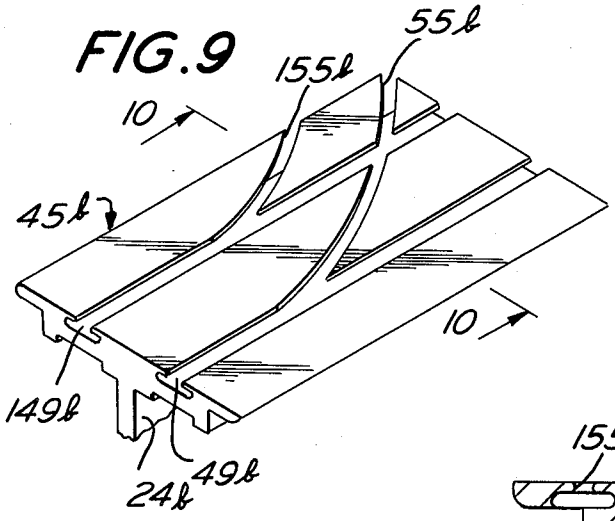


FIG. 9



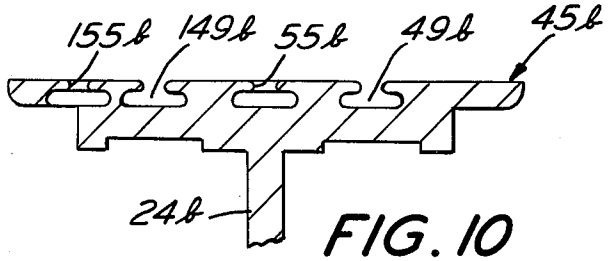


FIG. 10

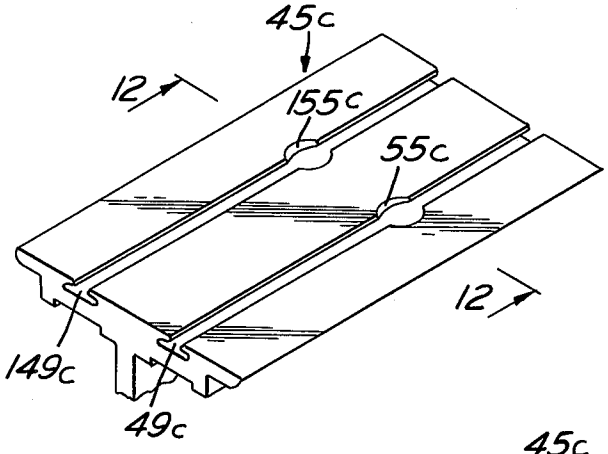


FIG. 11

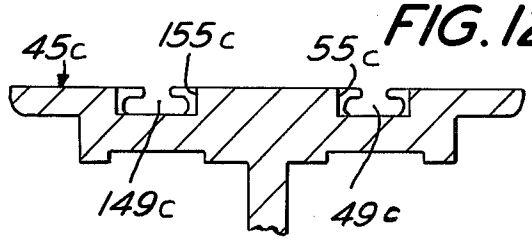


FIG. 12

DOOR SAFETY EDGE CONSTRUCTION

BACKGROUND OF THE INVENTION

As is well known to those versed in the art of safety edges for doors and the like, considerable problems have heretofore been experienced in attachment of safety edges to both new door construction and existing doors. Also, repair and replacement of worn out safety edge constructions involve substantial labor costs.

SUMMARY OF THE INVENTION

It is, therefore, an important object of the present invention to provide a door safety edge construction which overcomes the above-mentioned difficulties, permitting of quick and easy attachment to both new door construction, either at the factory or the installation sight, as well as facilitating insulation on existing doors, both by way of replacing a previously existing safety edge, and by the addition of a safety edge to an existing door not previously having a safety edge.

It is a further object of the present invention to provide a door edge construction having the advantageous characteristics mentioned in the preceding paragraph, wherein the labor time and skill required for installation or attachment is greatly reduced, without sacrificing quality of workmanship or integrity of the finished structure.

It is still a further object of the present invention to provide a door safety edge construction of the type described wherein an effectively sealed unit may be quickly and easily installed on or removed from a door, whether it be new door construction at the factory, or a previously installed door at the sight of operation.

It is a further object of the present invention to provide a door safety edge construction having the advantageous characteristics mentioned in the preceding paragraphs, which is extremely simple and durable in structure, economic in manufacture, installation and maintenance, and highly reliable in operation throughout a long useful life.

Other objects of the present invention will become apparent upon reading the following specification and referring to the accompanying drawings, which form a material part of this disclosure.

The invention accordingly consists in the features of construction, combinations of elements, and arrangements of parts, which will be exemplified in the construction hereinafter described, and of which the scope will be indicated by the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a partial perspective view showing an installed door, which may be an overhead or rolled type, and may incorporate the safety edge construction of the present invention.

FIG. **2** is a partial sectional elevational view, taken generally along the line **2—2** of FIG. **1.**

FIG. **3** is a partial perspective end view of a safety edge attachment for doors, constructed in accordance with the teachings of the present invention, and partly broken away to illustrate interior structure.

FIG. **4** is a partial bottom plan view showing a door edge plate constructed in accordance with the teachings of the present invention.

FIG. **5** is a transverse sectional view taken generally along the line **5—5** of FIG. **4.**

FIG. **6** is a partial bottom perspective view showing a slightly modified form of door edge plate of the present invention.

FIG. **7** is a transverse sectional view taken generally along the line **7—7** of FIG. **6.**

FIG. **8** is a sectional elevational view similar to FIG. **2,** but illustrating a further embodiment of the instant invention.

FIG. **9** is a partial bottom perspective view showing the attachment member of FIG. **8.**

FIG. **10** is a transverse sectional view taken generally along the line **10—10** of FIG. **9.**

FIG. **11** is a partial bottom perspective view showing another slightly modified embodiment of attachment member of the present invention.

FIG. **12** is a transverse sectional view taken generally along the line **12—12** of FIG. **11.**

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now more particularly to the drawings, and specifically to FIGS. **1–5** thereof, in FIG. **1** is shown a building **20** having an opening or doorway **21** and a door **22** movable into and out of closing relation with respect to the doorway. The door **22** may be of any suitable type, and is shown therein as an overhead door, say of roll-up construction including a plurality of pivotally connected or articulated, side-by-side slats **23.**

The extreme or edgemost door slat or panel, which moves into and out of proximate closing relation with the door threshold, is designated **24,** and includes a safety edge construction of the present invention, generally designated **25.** That is, the extreme or edgemost door panel **24** may be suitably articulated to the next adjacent slat or panel **23,** as seen in FIG. **2,** as by interfitting hinge formations **25** and **26,** for movement of the panel **24** toward and away from a door jamb or threshold with the safety edge construction **25** carried into and out of closing engagement with the door jamb or threshold.

The safety edge construction **25** is generally of elongate configuration, extending closely along and secured to the panel **24.** More specifically, the safety edge construction **25** includes an elongate inner body or core **26,** say of the type disclosed in my prior U.S. Pat. No. 3,315,050. Thus, the inner body **26** is resiliently compressible, say fabricated of rubber or plastic foam material, and pressure sensitive to actuate switch means, say to close an electric circuit by moving flexible contact strips **27** and **28** into electrical contact with each other.

The inner body or foam core **26** is completely encompassed, throughout its length and on all sides, by a casing **30,** which may advantageously be fabricated of flexible sheet material, such as suitable plastic. The casing **30** is fabricated of a flexible sheet material which is impervious to liquid, vapor and gas, and effectively sealed, as by suitable adhesive, thermosealing, radio-frequency welding, or other suitable means to insure an hermetically sealed casing **30** entirely and conformably enclosing the inner body **26.**

As illustrated, the inner body **26** may be of a generally rectangular cross-sectional configuration, and substantially constant throughout its length. In conformance with the inner body **26,** the casing **30** may include a generally rectangular bottom wall **31,** generally

rectangular side walls **32** and **33**, which may upstand integrally from opposite sides of the bottom wall, and generally rectangular end walls **34**, see FIG. **3** which may upstand from the bottom wall **31** extending laterally between side walls **32** and **33**, being respectively secured thereto by suitable hermetically sealed seams **35**, **36** and **37**. The casing **30** may further include an additional generally rectangular closing or covering sheet **38**, also of generally rectangular outline configuration and suitably hermetically secured along its margins to the upper edges of said walls **32** and **33**, and end walls **34**, as by securements or seams **39**, **40** and **41**.

The movable edge of door **22**, say along the free edge of slat or panel **24**, is provided with an edge plate **45**, say of generally rectangular configuration extending along and longitudinally coextensive with door slat **24**. In practice, the edge plate **45** may be formed integrally with the door slat **24** extending generally normal thereto remote from the hinge part **26** and terminating at opposite longitudinal edges **46** and **47**, which may be equally spaced on opposite sides of the door slat **24**. The lateral dimension or extent of edge plate **45**, as between longitudinal edges **46** and **47**, may approximate the lateral or horizontal dimension of the pressure sensitive edge assembly **25**, being located congruent thereto.

The edge plate **45** is generally planar or flat, and may have its under or outer surface **48** recessed, as at **49** to form a downwardly or outwardly facing groove. Further, the groove **49** may extend longitudinally of the edge plate **45**, being longitudinally coextensive therewith so as to terminate at opposite ends of the edge plate, and may be located laterally medially of the edge plate, say equally spaced between the side edges **46** and **47** of the plate. The downwardly or outwardly facing groove or recess **49** is formed with a pair of laterally opposed, facing, spaced internal undercuts, as at **50** and **51**, all for purposes appearing presently.

In addition, the door edge plate **45** is formed with an access passageway, opening or groove **55**, see FIG. **4**, which is located adjacent to one end, as at **56**, of the edge plate and communicates with the groove **49**. The access opening or passageway **55** may be of a cross-sectional configuration essentially similar to that of groove **49**, as best seen in FIG. **5**, and the access passageway **55** may extend from one side edge, say edge **47** of the plate **45** diagonally inwardly for mergence with the groove **49**.

Interposed between the edge plate **45** and upper side or covering sheet **38** of the pressure sensitive edge assembly **25** is a generally rectangular attachment member **56**, being sandwiched between and generally congruent to both the plate **45** and cover sheet **38**. Further, the generally rectangular attachment member **56** may advantageously be of a flexible characteristic, but somewhat stiffer than the rather freely compressible and flexible assembly of body **26** and cover **30**. In practice, the attachment member **56** may be of suitable plastic material, having a thickness sufficient to afford the desired stiffness and flexibility, and is hermetically sealed about its peripheral margins, as by thermosealing, welding or other suitable means. Specifically, the attachment member **56** may be secured by suitable hermetic sealing, as along longitudinal edge seams **57** and **58** to respective longitudinal margins of cover sheet **38**, and also suitable hermetically sealed, as at **59**, along opposite end margins to respective adjacent end margins of the cover sheet **38**. Thus, the attachment member **56** is hermetically sealed about its entire periphery to the entire periphery of the nether cover sheet **38**.

Provided on the upper side of attachment member **56**, say being formed integrally therewith and longitudinally coextensive is an upstanding rib **60**. The rib **60** may be located laterally medially between the longitudinal side edges of attachment member **56**, longitudinally coextensive therewith, and generally T-shaped in section, having an upper cross region **61** defining opposite lateral extensions or outstanding edges **62** and **63**.

It will now be appreciated that the rib **60** is cross-sectionally similar to the groove **49**, and is conformably engaged therein, as seen in FIG. **2**, the laterally outstanding edges **62** and **63** engaging in the undercuts **50** and **51** for positive retention against separation. That is, the entire safety edge unit **25**, **56** is somewhat longitudinally flexible or bendable for longitudinal or endwise movement of rib **60** into groove **49** as illustrated in FIG. **2**.

In the attachment procedure, the flexibility of the unit **25**, **56** permits of endwise movement of rib **60** into access passageway **55** and thence into groove **49**. While there is usually some space available adjacent to the open end of groove **49**, beyond the plate edge **56**, this space may not be sufficient to accommodate the entire safety edge unit, so that the access passageway **55** may be advantageous.

In the embodiment shown in FIGS. **6** and **7**, there is provided an access passagewy **55***a* in the nature of an enlarged opening or hole entering through the outer space **48***a* of edge plate **45***a* into the groove **49***a*. The enlarged access passageway or hole **50***a* may be adjacent to and spaced from the plate end edge **56***a* and is sized to permit movement therethrough of the entire rib **60**, including the lateral extensions **62** and **63**.

A further embodiment is shown in FIGS. **8–10**, wherein a pressure sensitive unit **25***b* includes an attachment member **56***b* and is attached to a door edge plate **45***b* carried by a door slat or panel **24***b*.

The embodiment of FIGS. **8–10** may be essentially similar to the first described embodiment, except that the attachment member **56***b* is provided on its upper side with a pair of parallel spaced longitudinally extending, upstanding ribs **61***b* and **161***b*, which may be substantially identical, each including a laterally enlarged upper portion. The ribs **61***b* and **161***b* may be suitably provided, as by integral formation, on the upper side of attachment member **56***b*.

In addition, the under or outer surface **48***b* of edge plate **45***b* is formed with a pair of parallel spaced longitudinally extending grooves **49***b* and **149***b* configured and arranged to respectively conformably receive ribs **61***b* and **161***b* to retain the same against separation from the plate.

Further, as seen in FIGS. **9** and **10**, edge plate **45***b* may be formed with a pair of access passageways or grooves **55***b* and **155***b* extending in parallelism with each other diagonally of the plate, adjacent to one end thereof for mergence with respective grooves **49***b* and **149***b*. These access passageways or grooves **55***b* and **155***b* may be used to facilitate entry of ribs **61***b* and **161***b* endwise into grooves **49***b* and **149***b* when there is insufficient space available beyond the end **56***b* of plate **45***b*.

A further embodiment is shown in FIGS. **11** and **12**, wherein a plate **45***c* is provided with a pair of parallel

spaced, longitudinally extending grooves **49***c* and **149***c* adapted to respectively receive the ribs **61***b* and **161***b* of the unit **25***b*, 56*b*. However, the plate **45***c* is provided with a pair of access passageways or openings **55***c* and **155***c*, which communicate respectively with grooves **49***c* and **149***c*. The access openings or passageways **55***c* and **155***c* are enlarged holes of sufficient dimension to pass the laterally extended regions of ribs **61***b* and **161***b* into the undercuts of grooves **49***c* and **149***c*, in essentially the same manner as the embodiment of FIGS. **5** and **6**.

From the foregoing, it will now be appreciated that the device of the present invention provides a door safety edge construction which greatly simplifies and expedites installation, maintenance and repair, and otherwise fully accomplishes its intended objects.

Although the present invention has been described in some detail by way of illustration and example for purposes of clarity of understanding, it is understood that certain changes and modifications may be made withint the spirit of the invention.

What is claimed is:

1. A door safety edge comprising a door edge plate for longitudinal extension along a door edge and having an outer surface facing away from the door, said door edge plate having its outer surface generally flat, there being at least one longitudinally extending groove in said outer edge plate surface, said groove having opposite internal undercuts, a resiliently compressible pressure sensitive inner body extending longitudinally along said edge plate adjacent to said groove, a casing of flexible sheet material covering said inner body, an attachment member of relatively stiff flexible material secured to said body adjacent to the door, and at least one relatively stiff rib on said attachment member and located in said groove, said rib including lateral extensions engaged in said undercuts for retention against separation from said plate, said attachment member being generally flat and secured in facing relation with said inner body interposed between the latter and said edge plate, said outer edge plate surface having an access passageway communicating with said groove adjacent to and spaced inwardly from one groove end for passing said rib into said groove.

2. A door safety edge construction according to claim **1**, said casing completely encompassing said body in sealing relation therewith, and said attachment member being secured to said casing in sealing relation with the latter about a closed configuration.

3. A door safety edge construction comprising a door edge plate for longitudinal coextension along a door edge and having an outer surface facing away from the door, said door edge plate having its outer surface generally flat, there being at least one longitudinally extending groove in said outer edge plate surface, said groove having opposite internal undercuts, a resiliently compressible pressure sensitive inner body extending longitudinally along said edge plate adjacent to said groove, a casing of flexible sheet material covering said inner body, an attachment member of relatively stiff flexible material secured to said body adjacent to said door, and at least one relatively stiff rib on said attachment member and located in said groove, said rib including lateral extensions engaged in said undercuts for retention against separation from said plate, said inner body, casing, attachment member and rib being a longitudinally flexible unit, and said outer edge plate surface having an access passageway communicating with said groove adjacent to and spaced inwardly from one groove end for passing said rib into said groove upon flexure of said unit.

4. A door safety edge construction according to claim **3**, there being an additional longitudinally extending undercut groove in said outer edge plate surface parallel to and spaced from said first mentioned groove, and an additional relatively stiff flexible rib on said attachment member parallel to and spaced from said frist mentioned rib and located in said additional groove, said first rib including lateral extensions engaged in said undercut additional groove for retention against separation from said plate.

5. A door safety edge construction according to claim **3**, said attachment member being generally flat and secured in facing relation with said inner body interposed between the latter and said edge plate.

6. A door safety edge construction according to claim **3**, said casing completely encompassing said body in sealing relation therewith, and said attachment member being secured to said casing in sealing relation with the latter about a closed configuration.

* * * * *