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Shanok et al.

[11] **3,730,577**

[45] **May 1, 1973**

[54] **MAGNETO-RESPONSIVE COMPOSITE MOLDING**

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[52] **U.S. Cl.**.....**292/251.5,** 49/394

[51] **Int. Cl.**.....**E05c 19/16**

[58] **Field of Search** 49/394; 292/251.5; 317/59, 159, 201; 160/368; 312/296

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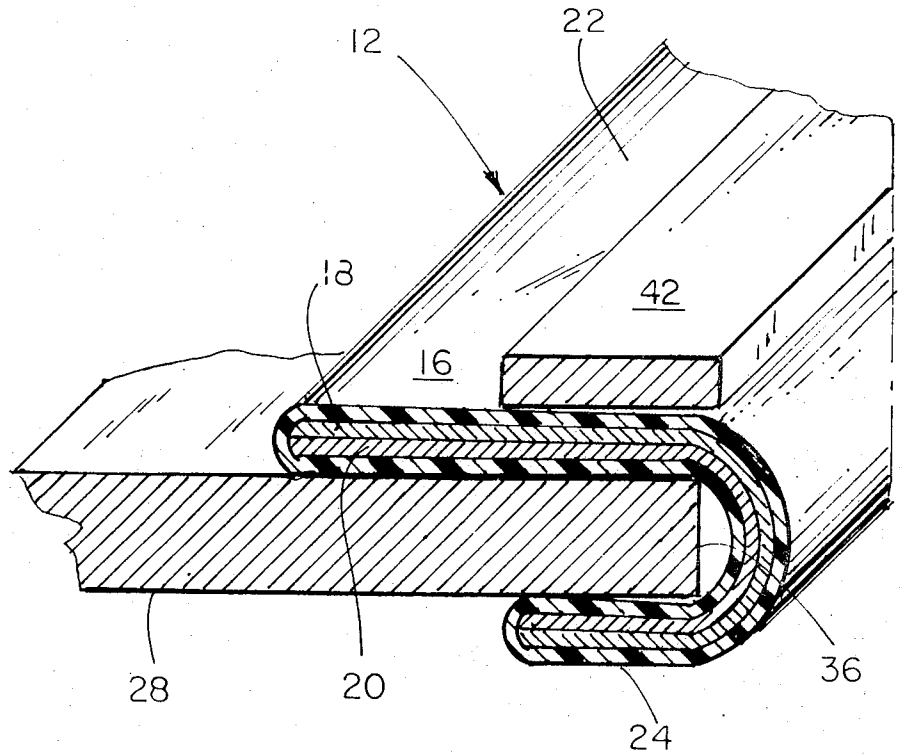
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[57] **ABSTRACT**

A magneto-responsive composite molding comprising an elongate casing adapted for operative association with a closure such as a door edge. The casing includes a pair of opposing faces one of which is adapted to contact and be concealed by the a closure or door edge and the other of which is adapted to be exposed relative to the closure or door edge. The composite molding furthermore includes at least one metallic strip which is encapsulated within the casing between the pair of opposing faces of the latter. The metallic strip is constituted of magnetically responsive material for responding to a magnetic force or magnetic forces of a magnetic field provided by a magnetic element mounted in the door frame across which the door edge may be swung.

9 Claims, 6 Drawing Figures



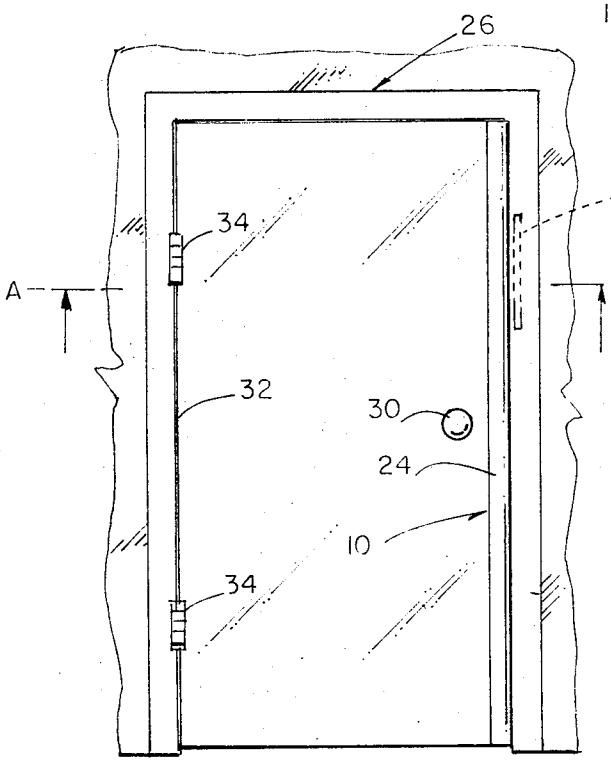


FIG. 1.

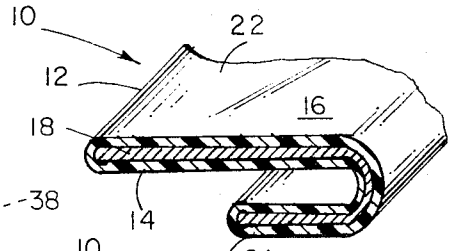


FIG. 4.

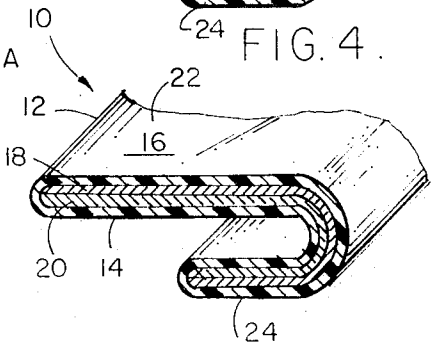


FIG. 5.

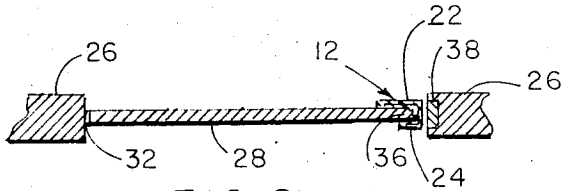


FIG. 2.

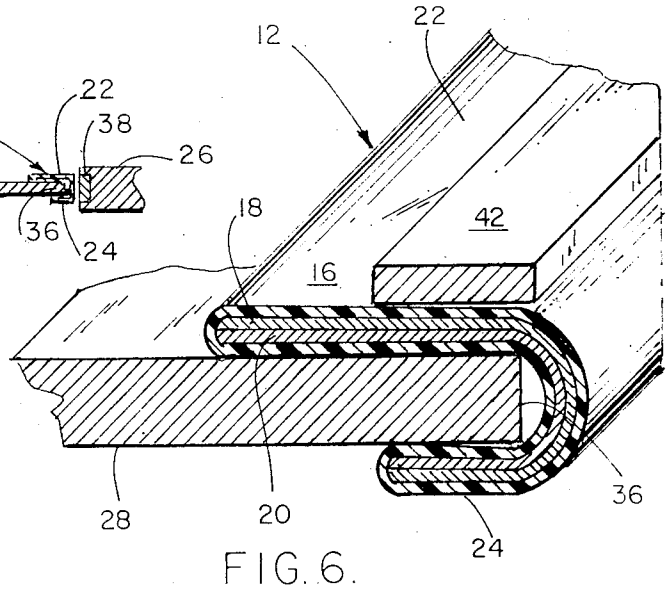
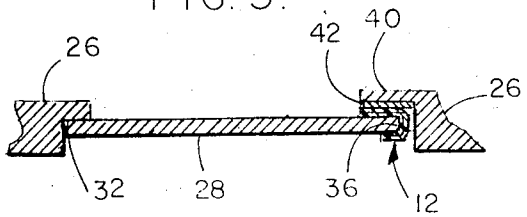


FIG. 6.

FIG. 3.



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MAGNETO-RESPONSIVE COMPOSITE MOLDING

BACKGROUND OF THE INVENTION

The present invention relates generally to door closure and retaining assemblies, and more particularly to a door closure and retaining assembly having no moving parts associated therewith for retaining the door in a closed position.

Door closure and retaining assemblies are conventional, well known and are provided in numerous arrangements. The most common type of door closure and retaining assembly is that of the door latch which is operated by the door handle, which door latch is displaceable into and out of a retaining receptacle provided in the door frame adjacent the door. This type of door closure and retaining assembly is somewhat satisfactory in that it clearly is capable of maintaining the door in a closed position relative to the door frame thereof. It has been determined however, through experience, that these types of assemblies which contain moving parts, i.e., the displaceable door latch and the mechanism associated therewith, are subject to breakdown requiring repair thereof periodically and are generally unsuitable for utilization in those doorways which have heavy personnel traffic associated therewith. This is due to the required manipulation thereof which is often cumbersome when persons are carrying items in two hands, and the relatively slow response to manipulation when persons wish to pass through the doorway rapidly.

The above disadvantages have led to the development or installation of door closure and retaining assemblies that do not have moving parts associated therewith such as those which are magnetic in nature. In this respect, the door frame is provided with a magnetic element and the door edge is provided with a magnetically responsive element and thus, as the door is swung toward the door frame and the magnetic element therein, both the magnetically responsive element and the magnetic element in cooperation therewith act to secure the door in a closed position. This magnetic arrangement, although satisfactory in operation, is generally crude and primitive because of its rather unsightly nature. Both the magnetically responsive element and the magnetic element itself are unsightly since they are usually simply unfinished metallic elements positioned on the door where they are constantly exposed and readily visible from most vantage points. Furthermore, because of the unfinished nature of these metallic elements, they tend to deteriorate or rust upon prolonged exposure to moisture in the air. Experience has also determined that these metallic elements tend to distort and gouge or scratch the opposing or contacting surfaces thereof upon impact with one another thereby further increasing the unsightliness of the elements.

Another disadvantage with regard to these assemblies is the fact that they require time-consuming aligning of the magnetic element opposite the magnetically responsive element thus increasing the time of installation.

SUMMARY OF THE INVENTION

Accordingly, it is an object of the present invention to provide a door closure and retaining assembly that has no moving parts associated therewith.

It is a further object of the present invention to provide a door closure and retaining assembly which is magnetic in nature.

It is still another object of the present invention to provide a door closure and retaining assembly which is decorative.

It is another object of the present invention to provide a door closure and retaining assembly which acts to protect the door edge upon which it is mounted.

It is still another object of the present invention to provide a door closure and retaining assembly of magnetic nature which may be easily installed and mounted on a door edge.

It is another object of the present invention to provide a magnetic door closure assembly which is economical to both manufacture and ship.

It is still a further object of the present invention to provide a magnetic door closing or retaining assembly which is acclimated or easily adaptable for installation on both one-way and two-way doors.

It is still a further object of the present invention to provide a magnetic door closure and retaining assembly wherein, all of the magnetic and metallic elements are protected from one another against direct impact with one another.

To this end with the above objects in mind, the present invention comprises a magneto-responsive composite molding comprising an elongate casing adapted for operative association with a closure such as a door edge. The casing includes a pair of opposing faces one of which is adapted to contact and be concealed by the closure or door edge and the other of which is adapted to be exposed relative to the closure or door edge. The composite molding furthermore includes at least one metallic strip which is encapsulated within the casing between the pair of opposing faces of the latter. The metallic strip is constituted of magnetically responsive material for responding to a magnetic force or magnetic forces of a magnetic field provided by a magnetic element mounted in the door frame across which the door edge may be swung.

BRIEF DESCRIPTION OF THE DRAWINGS

With the above and additional objects and advantages in view as will hereinafter appear, this invention comprises the devices, combinations, and arrangements of parts hereinafter described and illustrated in the accompanying drawings of a preferred embodiment in which:

FIG. 1 illustrates an elevational view of both a door and door frame having associated therewith the composite molding according to the present invention;

FIG. 2 illustrates a cross-sectional view taken along the line A—A in FIG. 1 of one embodiment according to the present invention;

FIG. 3 illustrates a cross-sectional view taken along the line A—A in FIG. 1 of a further embodiment according to the present invention;

FIG. 4 illustrates a perspective view of a fragment of the composite molding according to one embodiment of the present invention;

FIG. 5 illustrates a perspective view of a further embodiment of the present invention similar to that of FIG. 4; and

FIG. 6 illustrates a perspective view of the operative association of the composite molding according to the present invention with that of a magnetic member.

DETAILED DESCRIPTION OF THE INVENTION

Referring now to the drawings and more particularly to FIGS. 4 and 5 thereof, the present invention comprises a magneto-responsive composite molding denoted by the reference character 10. The composite molding 10 includes a body of thermoplastic material 12, the latter having an inner-face 14 which is adapted to contact and be concealed by a closure such as a door edge and an outer-face 16 adapted to be exposed relative to the closure or door edge. The concealment of the inner-face 14 and exposure of the outer-face 16 will be further clarified below.

The body of thermoplastic material 12 constitutes a casing which is generally transparent and encapsulates a metallic strip 18. The metallic strip 18 is constituted of magnetically-responsive material for operative association with a magnetic source in a manner as will be further discussed below. The metallic strip 18 is of elongate extent substantially identical to that of the casing or body of thermoplastic material 12 within which the strip 18 is encapsulated. In order to enhance the metallic content of magnetically responsive material, there is illustrated a further embodiment in FIG. 5 wherein there is provided a further metallic strip 20 extending in flush relation with the metallic strip 18 and is generally co-extensive therewith. It is clear from FIG. 5 that the metallic strips 18 and 20 respectively, have a combined width transversely of the opposing faces 14 and 16 respectively which is substantially greater than that portion of the thermoplastic 12 wherein the outer or exposed face 16 extends.

As illustrated clearly in both FIGS. 4 and 5, the composite molding 10 is provided in transverse cross-section with a U-shaped extent defined by a pair of integrally interconnected limbs 22 and 24 respectively. In the preferred embodiments of FIGS. 4 and 5, the limb 22 is substantially of greater length than that of the limb 24. The purpose of forming the composite such that the limb 22 is of greater length than that of the limb 24 will be discussed further below and it should be equally clear that the limbs 22 and 24 may also be of generally identical length and still remain within the concept or principle of the present invention.

The magneto-responsive composite molding 10 may be utilized for door closure and retaining purposes and this feature of the present invention may be readily appreciated by referring to FIGS. 1–3. In FIG. 1 there is illustrated a door frame 26 upon which is mounted a door 28 having a door handle 30 or the like. The door 28 is provided with a vertically extending door edge 32 most remote from the door handle 30, which door edge 32 is hingedly or pivotally connected to the door frame 26 by conventional hinges 34 or the like and therefore the door 28 may be constituted as a free swinging two-way door as illustrated in FIG. 2 or as a one-way door as illustrated in FIG. 3. The door 28 is also provided with a further vertically extending door edge 36 most proximate the door handle 30, which door edge 36 is adapted to be swung across the door frame 26 to permit the ready flow of personnel traffic. The door frame 26 is furthermore provided with a magnetic member 38 in close proximity to that point across which the door edge 36 is adapted to be swung.

Pursuant to the principles of the present invention, the magneto-responsive composite molding 10 is mounted upon the door edge 36 so that it embraces the latter and is generally co-extensive vertically therewith. The composite molding 10 is connected to the door edge 36 in a conventional manner such as by adhesive means or the like, and because of the preformed U-shaped extent of the composite molding 10, it is readily adapted for being mounted upon the door edge 36 in embracing relation with the latter. Since the mounting procedure of installing the composite molding 10 upon the door edge 36 is conventional, further description of same is omitted for the sake of clarity.

As illustrated in FIG. 2, the magnetic member 38 is fixedly positioned within the door frame 26 opposite the door edge 36 and thus creates a magnetic field to which the metallic strip 18 or both the metallic strip 18 and metallic strip 20, depending on which embodiment is employed, is responsive. Thus, it is clear from FIG. 2 that the door 28 may be swung in two directions, and because of the magnetic field created by the magnetic member 38, the door edge 36 is urged toward the magnetic member 38 in a closed position.

However, as illustrated in FIG. 3, the door 28 may be mounted upon a door frame 26, the latter which includes a door jam 40 against which the edge 36 of the door 28 may engage. In this latter embodiment, according to the present invention, there is provided a magnetic member 42 mounted in the door jam 40 and is generally similar to that of the magnetic member 38 as illustrated in FIG. 2. Thus, when the door edge 36 approaches the door jam 40, the magneto-responsive composite molding 10 is urged toward the magnetic member 42 to retain the door in a closed position.

It is clear from the above description that the composite molding 10 is decorative in the sense that it is neat and at least partially light-reflective for providing esthetically pleasing visual effects. Furthermore, the thermoplastic body 12 acts to protect the door edge 36 since the body 12 is constituted of a synthetic resin such as vinyl chloride or cellulose acetate butyrate or the like and thus is rather sufficiently strong for resisting impact without damage thereto. Of course, as discussed above, the most important feature of the present invention is the fact that it may be utilized for retaining or securing a door in a closed position. The door closure and retaining feature of the present invention is effected completely without any moving parts and thus the passage of personnel traffic through the doorway upon which the present invention is mounted can be done easily and effectively without obstacle thereto. Furthermore, there is little or no chance of a breakdown since in fact, there are completely absent moving parts from the present invention and clearly therefore, the present invention is most desirable in those areas especially accommodating heavy personnel traffic.

It is also significant to point out that the thermoplastic body 12 not only protects the door edge 36 upon which it is mounted, but also serves to protect the magnetically-responsive member encapsulated therein. In this respect, the magnetically-responsive member which is generally metallic is protected from adverse

environmental conditions such as moisture in the air and thus will not rust after prolonged periods. Furthermore, there will be obviated any direct contact of the magnetically-responsive material with that of the magnetic material mounted in the door frame **26**. Because of the prevention of direct contact of the magnetically-responsive member and the magnet itself, there is obviated the potential distortion or scratches which otherwise deform or impair the appearance of the co-acting magnetically associated members.

It is noteworthy to point out that the purpose of providing two metallic strips **18** and **20** as illustrated in FIG. **5** rather than providing the single metallic strip **18** as illustrated in FIG. **4**, is to enhance the metallic content of the magnetically-responsive material within the thermoplastic body **12**. It should be clear however, that the metallic strip **18** as illustrated in FIG. **4** can be provided in transverse cross-section with a greater width than that as illustrated in FIG. **4** and therefore substantially identical to that width as illustrated in FIG. **5** for the combined strips **18** and **20**. The metallic content would essentially thus be the same, however, it has been determined that it is easier to work with thinner strips and place them in abutting flush relation with one another rather than with a thicker strip as aforementioned. It should be clear to those skilled in the art that the purpose of enhancing or increasing the metallic content of magnetically-responsive material is clearly to enhance the attraction of the magnetic member **38** for the magnetically-responsive strip **18** or strips **18** and **20** as the case may be.

It is noteworthy that the limb **22** is of greater extent than that of the limb **24** of the molding. This is to provide the door edge **36**, as illustrated in FIG. **3**, with a greater quantity of magnetically-responsive metal for association with the magnet **42** mounted on the door jam **40** and yet still provide the door edge with a decorative trim defined by the limb **24**. Although the molding or body **12**, as illustrated in FIG. **2**, is also provided with limbs differing in extent, it would be equally appropriate to provide same with limbs of generally equal extent because of the nature of the two-way door arrangement therein and the location of the magnet **38**.

Numerous alterations of the structure herein disclosed will suggest themselves to those skilled in the art. However, it is to be understood that the present disclosure relates to a preferred embodiment of the invention which is for purposes of illustration only and not to be construed as a limitation of the invention.

What is claimed is:

1. A composite molding comprising an elongate casing adapted for operative association with a closure, said elongate casing being transparent and constituted of thermoplastic, said casing including a pair of opposing faces with one face adapted to contact and be concealed by the closure and the other face adapted to be exposed relative to the closure, at least first and second metallic strips encapsulated within said casing between said pair of opposing faces, said first metallic strip being constituted of magnetically responsive material, said first and second metallic strips having an elongate extent substantially equal to that of said casing, and said second metallic strip extending in flush relation with said first metallic strip.

2. A composite molding as claimed in claim **1**, wherein said second metallic strip is also constituted of magnetically responsive material.

3. A composite molding as claimed in claim **1**, wherein each of said metallic strips is co-extensive with one another.

4. A composite molding as claimed in claim **3**, wherein said metallic strips have a combined width transversely of said opposing faces of said casing substantially greater than that portion of the thermoplastic wherein said exposed other face extends.

5. A composite molding as claimed in claim **1**, wherein said casing is generally U-shaped in cross-section and defined by a pair of integrally interconnected limbs.

6. A composite molding as claimed in claim **5**, wherein one of said limbs has an extent substantially greater than that of the other of said limbs.

7. A composite molding as claimed in claim **5**, in combination with a door edge and door frame across which said door edge may be swung, said limbs being adapted to fixedly embrace said door edge, said door frame including a magnetic element for operative association with said first metallic strip.

8. A composite molding as claimed in claim **7**, wherein said magnetic element extends in said door frame at a position against which the door edge upon which said molding is supported engages.

9. A composite molding as claimed in claim **8**, wherein said casing and said door edge are co-extensive with one another.

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