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DOOR SAFETY GUARD CONSTRUCTIONS

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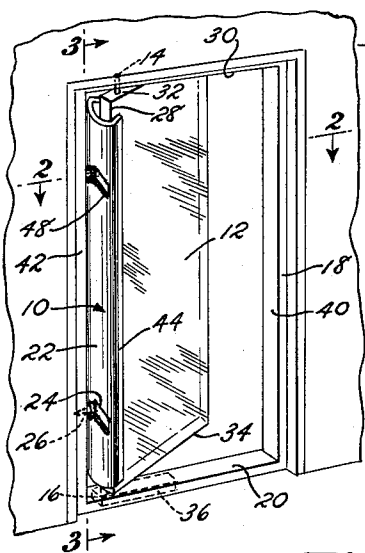


Fig. 1

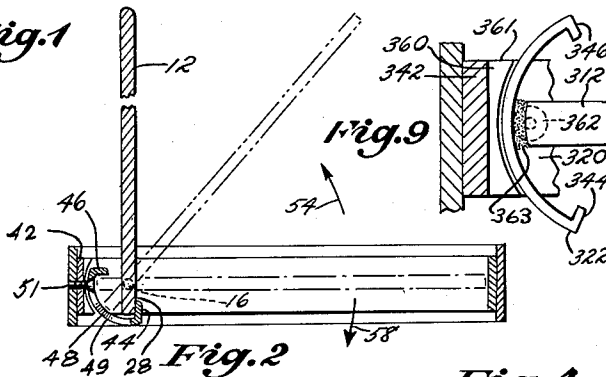


Fig. 2

Fig. 3

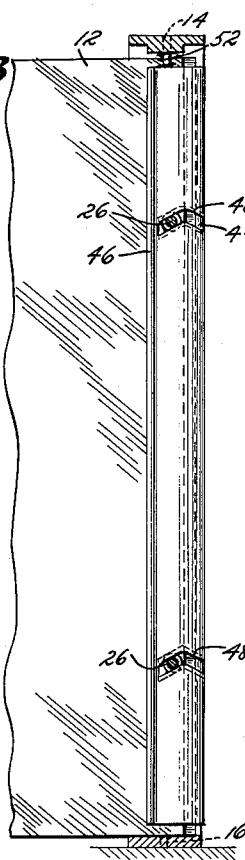


Fig. 4

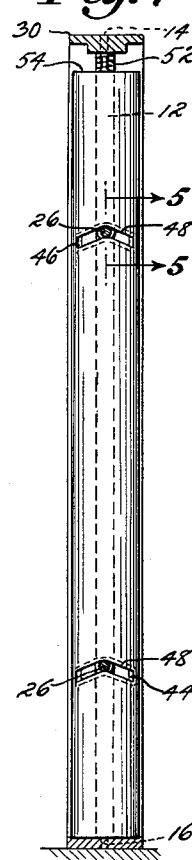


Fig. 6

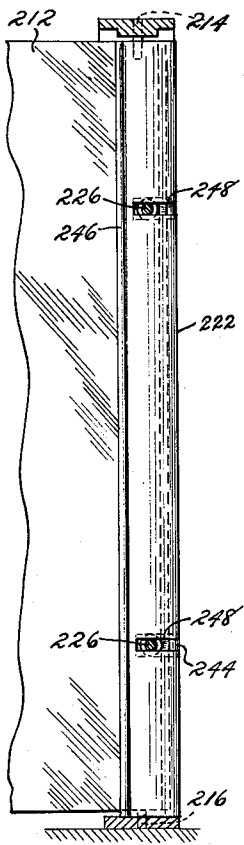
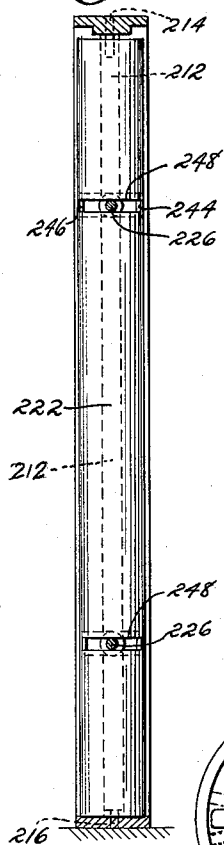


Fig. 7

Fig. 8

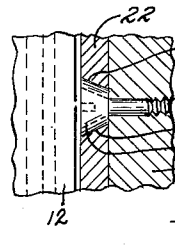
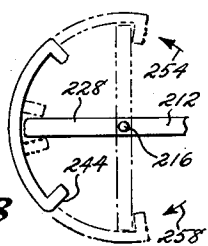


Fig. 5

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DOOR SAFETY GUARD CONSTRUCTIONS

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8 Claims. (Cl. 20—16)

This invention relates generally to doors and more particularly to safety door guards for glass doors mounted on hinges.

Because of their attractive appearance, and because of improvements in the tempering thereof, glass doors, particularly at the entrances of buildings, have come into wide use. In order to better support the same, it is usual to mount such doors so that they pivot about a vertical axis which is spaced inward from one vertical edge (the "hinge edge") of the door. When such a door is opened a substantial space occurs between the hinge edge of the door and the nearest edge of the building opening. Into this space it is possible to place a foot or a hand, which, if not removed as the door closes, will be seriously hurt. Increasing the space, when the door is closed, between the hinge edge and the edge of the building opening may reduce the degree of damage, but defeats the purpose of the door, which is complete closure.

It is therefore among the principal objects of the present invention to provide door safety guard construction which will prevent accidental injury of the types described above.

Another object of the present invention is the provision of structure which will not take away from the normal appearance and attractiveness of the glass door on which it is used.

Another object of the present invention is to provide a safety door guard which can be installed for operation with doors which are already in use, and which will require a minimum of service and repair.

A still further object herein is to provide structure as described which is of simple fool-proof construction, and low in cost of production so that the same may have a consequent wide distribution and use.

These objects and other incidental ends and advantages will more fully appear in the progress of this disclosure and be pointed out in the appended claims.

In the drawings, in which similar reference characters designate corresponding parts throughout the several views:

FIGURE 1 is a fragmentary view in perspective of a first embodiment of the invention with a door in a half-opened position.

FIGURE 2 is an enlarged horizontal sectional view as seen from the plane 2—2 in FIGURE 1.

FIGURE 3 is an enlarged fragmentary vertical sectional view as seen from the plane 3—3 in FIGURE 2.

FIGURE 4 is a view corresponding to FIGURE 3 but with the parts shown in the position they occupy when the door is closed.

FIGURE 5 is an enlarged fragmentary vertical sectional view as seen from the plane 5—5 in FIGURE 4.

FIGURE 6 is a vertical sectional view corresponding to FIGURE 4 but showing a second embodiment of the invention.

FIGURE 7 is a fragmentary vertical sectional view corresponding to FIGURE 6 but showing the parts in a position when the door is partially open.

FIGURE 8 is a fragmentary schematic horizontal sectional view corresponding generally to FIGURE 2, of the second embodiment.

FIGURE 9 is a fragmentary horizontal sectional view showing a third embodiment of the invention.

Turning to the first embodiment of the invention, generally illustrated in FIGURES 1 to 4, inclusive, the construction, generally indicated by reference character 10,

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may comprise a door 12, upper and lower door hinges 14 and 16, a door frame 18, a threshold 20, a guard element 22, guide means 24, and mounting means 26.

The door 12 may be of any desired construction, and although my invention is highly useful in connection with glass doors, it will also be useful with non-glass or partially glass doors where an opening is formed between the hinge edge 28 and the frame 18 when the door is opened. As will be understood by those skilled in the art, various types of door supporting hinges may be used, and I have shown by way of example hinges 14 and 16 consisting of pins which engage the upper horizontal door frame member 30 with the upper edge 32, and the threshold 20 with the lower edge 34. The door 12 is normally urged to a closed position by a door check 36 concealed by the threshold 20 and acting on the door through the pin 16. The free or swinging edge 38 of door 12 lies in juxtaposition with the vertical frame member 40, and the hinge edge 28 lies opposite vertical frame member 42 when the door is closed, leaving usually a small space, and it is in this space that the guard element 22 is disposed.

The guard element 22 is preferably composed of thin strong material. Where the guard element is used with a glass door, it is preferable to have the guard element transparent, in which case I fabricate it of transparent synthetic resin such as methyl methacrylate, cellulose acetate, rigid polyvinyl chloride, or the like. The shape, size and arrangement of the guard element should be considered in connection with the drawings. In thickness it should substantially be equal to the width of the space between the hinge edge 28 of the door and the frame element 42 so that it may have a sliding fit therebetween. The height of the guard element is slightly less than the distance between the threshold 20 and the under surface of the frame member 30, so that it may shift vertically. The body of the guard element 22 is in the shape of substantially a quarter of a cylinder whose radius is substantially the distance between the axis of the pins 14 and 16 and the space between the hinge edge 28 and the frame member 42. The longitudinal edges of the guard element are provided with door edge engaging flanges 44 and 46.

The guide means 24 are in the form of slots 48 which are of chevron or inverted V shape. The slots 48 are in the guard element and have angularly converging walls 49 so that they may ride on the conical rollers 50 rotatably mounted on the screws 51 which are engaged in the frame member 42 (FIGURE 5).

At rest, the guard element will be disposed in its lowermost and centered position (FIGURE 4), and it will seek this position due to the action of gravity. Where the material of which the guard element 22 is composed is of relatively light weight, it may be urged to the centered lower position by the action of a spring 52 exerting pressure between the frame member 30 and the upper edge 54 of element 22 upon which it has a sliding contact. The length of the slots 48 in each direction from center is determined to coincide with the amount of travel of the guard necessary to accommodate the swing in each direction of the door 12. In the example given here, the door is limited by the check 36 to 90° in each direction from the closed position.

Assuming the door to be closed as indicated by the dot-dash lines in FIGURE 2, the guard element will occupy its centered position (FIGURE 4). If the door 12 is moved in the direction of the arrow 54, as soon as it passes through 45° (dash-double-dot lines in FIGURE 2), the hinge edge 28 will engage the inner surface of the projection or flange 44 and will pull the guard element 22 around with it until, when the door has passed through 90°, it and the guard element will occupy the positions

shown in the full lines in FIGURE 2. When the door is released it swings closed and the guard returns to its starting centered position. When the door is swung in the direction of the arrow 58, since the parts are symmetrical the same mode of operation will occur in the opposite direction.

Turning now to the second embodiment of the invention, illustrated in FIGURES 6 to 8, inclusive, for the purpose of avoiding needless repetition certain of the parts corresponding to the prior described embodiment are given the same reference characters with the addition of the prefix "2."

The second embodiment differs from the first embodiment principally in that the guard element 222 is not self-centering but is free riding, normally being moved only in a horizontal plane by the door 212. This is accomplished by having the slots 248 horizontal and straight.

Assuming the guard element to be centered as shown by the full lines in FIGURE 8, movement of the door 212 in the direction of arrow 254 will, at approximately 45° displacement, cause engagement of the hinge edge 228 with the flange 244 and further movement of the door in the same direction will pull the guard element around to the dash-dot position indicated in FIGURE 8. Here it will stay until the door closes, and until the door is opened in the opposite direction (the arrow 258) where the above described operation will occur in the opposite direction, finally reaching the dash-double-dot line position in FIGURE 8.

In the third embodiment, illustrated in FIGURE 9, here again certain corresponding parts are given the same reference characters with the prefix "3."

The third differs from the second embodiment principally in that guide slots like slots 248 are absent, and instead the guide means takes the form of a pair of guides 360 located at the undersurface of the top frame member and the upper surface of the threshold 320. Only the bottom one is shown, but they are both identical. Guides 360 have a curved body 361, the inwardly exposed concave face of which conforms to the convex surface of the guard element 322, and guides 360 have a rotatable roller 362 which bears against the inner concave surface of the guard element 322.

The body 361 is secured to the inner face of the vertical frame member 342 while the roller 362 is mounted on the threshold 320.

In the third embodiment, the guard element may therefore present a clear, uniform, unobstructed appearance in keeping with the door it serves.

As seen in FIGURE 9, there may be secured to the concave surface of the guard element 322 an elongated piece of weather-stripping 363 composed of suitable material such as felt or nylon plush or velvet.

I wish it to be understood that I do not consider the invention limited to the exact details of structure shown

and set forth in this specification, for obvious modifications will occur to those skilled in the art to which the invention pertains.

I claim:

1. Door safety guard construction, comprising: a door frame; a door having front and rear surfaces; means to pivotally mount the door for movement about an axis spaced from said frame whereby a space is produced between the hinge edge of the door and said frame when the door is opened; guide means connected to said frame; a guard element disposed between said frame and said hinge edge, and movably mounted on said guide means, said guard element being shiftable within said guide means upon engagement therewith by said front or rear surfaces of said door; and means on said guard element engageable by said door at predetermined displacements of said door.

2. Structure as claimed in claim 1, in which the guide means are in the form of a projection extending from said frame towards said door, and the guard element has a slot into which said projection extends.

3. Structure as claimed in claim 1, in which the guide means are in the form of a projection extending from said frame towards said door, and the guard element has an inverted V-shaped slot into which said projection extends, whereby when unaffected by the position of said door, the guard element returns to its normal centralized position.

4. Structure as claimed in claim 1, in which the guide means are in the form of a projection extending from said frame towards said door, and the guard element has a horizontally-disposed slot into which said projection extends, said guard element remaining in displaced positions thereof until moved by said door.

5. Structure as claimed in claim 1, in which the guide means are in the form of a body connected to the frame, and having a curvate surface conforming to the shape of the outer surface of the guard element.

6. Structure as claimed in claim 1, in which the guide means are in the form of a body connected to the frame, and having a curvate surface conforming to the shape of the outer surface of the guard element, and a roller on the threshold of said door frame, said roller supporting said guard element in movements thereof.

7. Structure as claimed in claim 1, in which the guard element is in the shape of a portion of a cylinder, substantially less than 90°.

8. Structure as claimed in claim 1, in which the guard element is the shape of a substantially quarter cylinder.

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