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A BARRIER ASSEMBLY**Field of the invention**

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The invention relates to a barrier assembly for use in obstructing a passageway. The barrier assembly is particularly suited for use with a frame defining an opening such as a doorway or a window, and it will be convenient to hereinafter describe the invention in relation to this particular application. It should be appreciated however that the invention has wider application.

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Introduction

Throughout the specification, the term "barrier" is used to describe any structure that is operable to obstruct the passageway and includes doors, grilles, shutters and the like. Moreover, throughout the specification, the invention is described with reference to the orientation for use in frames wherein the plane of the frame thereof is generally vertical. This however should not be construed as limiting the invention to that orientation, as the barrier assembly may be used in other orientations. Accordingly, reference to a particular orientation is to be construed to encompass these other orientations.

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In the design and construction of buildings, there is a continuing need to produce a barrier assembly such as grilles which are resistant to tampering. In relation to hinged a barrier assembly, such as bi-fold grille panels,

they typically use a number of separate hinges to connect adjacent panels. Such separate hinges are relatively weak and susceptible to vandalism and/or forcible weakening by an intruder. In relation to a barrier assembly formed by panels which overlap to be parallel in the closed position, the barrier assembly can be easily tampered with by applying a force between the panels which is transverse thereto.

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Summary of the invention

It would be advantageous to provide a barrier assembly that offers greater resistance to tampering. An aim of the invention is therefore to provide a more secure and rigid barrier assembly design.

According to the invention, there is provided a barrier assembly for obstructing a passageway defined at least in part by a frame, including a first generally planar panel arranged to be pivotally mounted to the frame and movable between an open and a closed position, a second generally planar panel located adjacent the first panel, and a hinge means connecting the first and second panels permitting relative pivotal movement between the first and second panels, wherein the hinge means extends continuously for substantially the length of the edge of the first and second panel. Preferably, the second panel co-operates with the first panel to provide at least partial coverage of the opening when the first panel is in the closed position and the second panel is arranged to be coplanar therewith.

It is further preferable that the hinge means includes a first hinge joint associated with the first panel and a second hinge joint associated with the second panel and a retaining device to retain the respective hinge joints adjacent one another. Each hinge joint is preferably formed integrally with each panel, but this is not essential.

The retaining device is preferably a pin which is substantially the length of the edge of the first and second panel, although other means of retention can also be used.

In a preferred embodiment, an edge of the second panel remote from the first panel is slidably connected to the frame so that movement of said remote edge of the second panel is guided by the frame. To facilitate the sliding motion, the remote edge of the second panel may be slidably connected by rollers or guides mounted onto the edge of the second panel in contact with the frame. The frame may also include corresponding guides to cooperate with the rollers or guides of the second panel.

Preferably, a guard is located adjacent to the hinge means to impede access to the gap between the first and second panels when the barrier assembly is moved from the open to the closed position. The guard may optionally be formed integrally with the hinge means.

It is desirable but not essential to include a lock associated with the guard to allow releasable locking of the panels to the frame. It is preferable that the lock controls a locking device including at least a lock pin that has a locking position in which the lock pin is

extended into the frame and an unlocking position in which the lock pin is retracted. The lock may desirably be mounted in the guard, but may also be mounted onto the frame or other part of the panels.

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Although the illustrated embodiment only has two panels, the barrier assembly may also include one or more other panels located adjacent to the second panel remote from the first panel. Preferably, the one or more other panels are interconnected by hinge means extending continuously for substantially the length of the edge of each panel.

Preferably, the one or more other panels co-operate with the first and second panels to provide at least partial coverage of the opening when the first panel is in the closed position and the second and other panels are arranged to be coplanar therewith.

Also preferably, the hinge means interconnecting the one or more other panels each includes a hinge joint associated with one of the panels and another hinge joint associated with an adjacent panel and a retaining device to secure the respective hinge joints.

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It will be convenient to hereinafter describe an embodiment of the present invention with reference to the accompanying drawings which illustrate one form of barrier assembly incorporating the invention. It is to be understood that the particularity of the drawings and the related description is not to be understood as superseding the generality of the broad description of the invention as defined in the claims.

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Brief description of the drawings

5 The drawings illustrate a preferred embodiment of the invention.

Figure 1 is the front view of the barrier assembly according to a preferred embodiment of the invention when in the closed position.

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Figure 2 is an elevation view of the barrier assembly taken in section from A-A of Figure 1.

15 Figure 3 is a plan view of the barrier assembly in section from B-B of Figure 1.

Figure 4 is the same view as in Figure 3 but shows the barrier assembly in a partially open position.

20 Figure 5 is a magnified view of Figure 2 that more clearly illustrate the rollers and guides used with the barrier assembly.

Figure 6 is a magnified view of DD from Figure 3.

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Figure 7 illustrates the front and plan views in a closed and partially position of a barrier assembly with four panels according to another preferred embodiment of the invention.

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Detailed description of the preferred embodiment

35 Figure 1 is the front view of the barrier assembly according to the preferred embodiment of the invention

when in the closed position. The barrier assembly 10 includes two panels 12, 14 mounted to a frame 16. Each of the panels 12, 14 has an arrangement on its edge to allow it to be hinged to another panel.

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One edge of the panel 12 is pivotally connected to the frame 16 by conventional pivot assemblies 11. This allows the panel 12 to be pivoted between a closed position (as in Figure 1) and an open position (as in
10 Figure 4).

The second panel 14 is hingedly connected to the first panel 12 at the opposite edge of the panel 12. Further, at the end of the second panel 14 remote from the first
15 panel 12 is a roller 18 to allow sliding movement of that end of the second panel 12 along the frame 16.

Figure 2 is an elevation view of the barrier assembly taken in section from A-A of Figure 1. It illustrates
20 that the first panel 12 is coplanar with the second panel 14 when in the closed position. On the other hand, in the open position, the panels are folded to one side of the frame 16 until the panels are substantially parallel to each other in the completely open position and at the
25 same time are generally perpendicular to the plane of the frame 16. It is advantageous that the panels 12, 14 are coplanar and do not overlap in the closed position to prevent them from being forced apart by an intruder.

30 Figure 3 is a plan view of the barrier assembly in section from B-B of Figure 1. It shows that the panels 12, 14 are joined together by means of a hinge assembly which includes a first hinge joint 22 integrally formed with the first panel 12 and a corresponding second hinge

joint 24 integrally formed with the second panel 14. It is not essential that the hinge joint 22, 24 be formed integrally with each panel 12, 14. However, by making the hinge joints 22, 24 integral with the panels 12, 14, the grille assembly is made stronger because the hinge cannot be pried off the panels. A guard 28 can further be integrally formed with the second hinge joint 24, although this is not essential. The guard 28 reduces the likelihood that fingers are accidentally crushed during the closing operation of the panels 12, 14.

The separate hinge joints 22, 24 should extend for substantially the full length of the connected edges of respective panels 12, 14. This achieves a more secure and rigid design for the barrier assembly. Desirably, the hinge joints are connected by a retaining device or pin 26 which correspondingly extends substantially the length of the hinge assembly. A lock 30 is built into the guard 28 to operate a lock pin 38 which runs within an inside cavity of the guard 28. The lock assembly is therefore installed within the hinge assembly itself.

Figure 6 is a magnified view of DD from Figure 3.

Figure 4 is the same view as in Figure 3 but shows the barrier assembly in a partially open position. To open the panels 12, 14, a force is applied in a direction away from the plane of the frame 16 so that the panels pivot about the pin 26. The first panel 12 is attached to the frame 16 in the illustrated embodiment whilst the second panel 14 can be slid from end to end, to allow the grille to be opened or closed. The movement of the second panel 14 relative to the frame is assisted by the rollers 18

mounted to the remote end of the second panel 14, as can be seen in Figure 5.

Figure 5 is a magnified view of Figure 2 that more clearly illustrate the rollers and guides used with the barrier assembly. The rollers 18 connected to the top of the second panel 14 roll along a top guideway 32 formed at the top of the frame 16. Connected to the bottom of the second panel 14 is a guide 36. The guide 36 is limited in its movement along the frame 16 by a corresponding bottom guideway 34 formed at the bottom of the frame 16.

The lock pin 38 which runs the full length of the guard 28 can be extended or retracted by turning the cam lock (30 in Figure 4). In its extended position, it extends into holes 40, 42 in the frame 16, thereby securing the panels to the frame 16 in the closed position. In its retracted position (not shown), the lock pin 38 is withdrawn from the holes 40, 42 in the frame 16, allowing the panels to be opened.

The parts of the barrier assembly 10 are made and finished as desired by the user. These parts can be made by various processes such as cutting, grinding, welding and finishing. Suitable surface finishing such as painting, powder coating or others may be performed on the panels 12,14 and frame 16. Accessories such as locking devices, knobs, decorative and other panels may be installed according to the user's requirements as determined by the individual fixing details of the accessory. The processes used are not dealt with in depth as these are known to persons skilled in the art and generally relate to the aesthetic design of the

grille. All the radii and other profiled surfaces may vary as per process or user requirement. All visible voids may or may not be filled.

5 Furthermore, there may be more than two panels for the frame 16. Figure 7 illustrates the front and plan views in a closed and partially position of a barrier assembly with four panels according to another preferred embodiment of the invention. In that event, the other
10 panels are similarly hingedly joined to be interconnected and are also fitted with rollers. It is preferable that in the closed position, the first panel is in the closed position and all the other panels are coplanar with it. Each other panel preferably has the same type of hinge
15 assembly as that described above in relation to a frame with two panels, but this is not essential. The panels may or may not be symmetrical, although they should complement each other so that in the closed position, adequate partitioning is provided.

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It would be appreciated that the invention provides an alternative concept to the design of hinged barriers such as bi-fold grille panels which are more secure and elegant.

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Finally, while a particular embodiment of the invention has been shown and described, it will be appreciated by those skilled in the art that changes and modifications of the present invention may be made without departing
30 from the invention in its broader aspects. As such, the scope of the invention should not be limited by the particular embodiment and specific construction described herein but should be defined by the appended claims and equivalents thereof. Accordingly, the aim in the

appended claims is to cover all such changes and modifications as fall within the spirit and scope of the invention.



THE CLAIMS DEFINING THE INVENTION ARE:

1. A barrier assembly for obstructing a passageway defined at least in part by a frame, including:
- 5 a first generally planar panel arranged to be pivotally mounted to the frame and movable between an open and a closed position,
- 10 a second generally planar panel located adjacent the first panel, and
- a hinge means connecting the first and second panels permitting relative pivotal movement between the
- 15 first and second panels,
- wherein the hinge means extends continuously for substantially the length of the edge of the first and second panel.
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2. A barrier assembly according to claim 1, wherein the second panel co-operates with the first panel to provide at least partial coverage of the opening
- 25 when the first panel is in the closed position and the second panel is arranged to be coplanar therewith.
- 30 3. A barrier assembly according to claim 1 or 2, wherein the hinge means includes a first hinge joint associated with the first panel and a second hinge joint associated with the second panel and a



retaining device to retain the respective hinge joints adjacent one another.

5 4. A barrier assembly according to claim 3, wherein each hinge joint is formed integrally with each panel.

10 5. A barrier assembly according to claim 3 or 4, wherein the retaining device is a pin which is substantially the length of the edge of the first and second panel.

15 6. A barrier assembly according to any one of the preceding claims, wherein an edge of the second panel remote from the first panel is slidably connected to the frame so that movement of said
20 remote edge of the second panel is guided by the frame.

25 7. A barrier assembly according to claim 6, wherein the remote edge of the second panel is slidably connected by rollers or guides mounted onto the edge of the second panel in contact with the frame.

30 8. A barrier assembly according to claim 7, wherein the frame includes corresponding guides to cooperate with the rollers or guides of the second panel.



9. A barrier assembly according to any one of the preceding claims, including a guard located adjacent to the hinge means to impede access to the gap between the first and second panels when the barrier assembly is moved from the open to the closed position.
10. A barrier assembly according to claim 9, wherein the guard is formed integrally with the hinge means.
11. A barrier assembly according to claim 10, including a lock associated with the guard to allow releasable locking of the panels to the frame.
12. A barrier assembly according to claim 11, wherein the lock controls a locking device including at least a lock pin that has a locking position in which the lock pin is extended into the frame and an unlocking position in which the lock pin is retracted.
13. A barrier assembly according to claim 11 or 12, wherein the lock is mounted in the guard.
14. A barrier assembly according to any one of the preceding claims, which includes one or more other panels located adjacent to the second panel remote from the first panel.



15. A barrier assembly according to claim 14, wherein the one or more other panels are interconnected by hinge means extending continuously for substantially the length of the edge of each panel.

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16. A barrier assembly according to claim 15, wherein the one or more other panels co-operate with the first and second panels to provide at least partial coverage of the opening when the first panel is in the closed position and the second and other panels are arranged to be coplanar therewith.

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17. A barrier assembly according to claim 15 or 16, wherein the hinge means interconnecting the one or more other panels each includes a hinge joint associated with one of the panels and another hinge joint associated with an adjacent panel and a retaining device to secure the respective hinge joints.

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