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(54) **A cabinet and a door assembly therefor**

(57) A door assembly comprises a door (1) and second body (2) each having an internal cavity and pivotably secured together by a hinge (3) with an internal channel. Another door assembly comprises a first and second body each having an internal cavity, a hinge projecting from the first body and having an internal channel in fluid connection with the first body cavity, a pin projecting from the second body into the hinge channel to pivotably se-

cure the hinge and second body together such that the hinge channel and second body cavity are in fluid connection. Each assembly is adapted to receive a conduit (6) connecting the internal cavities via the hinge channel. In each assembly, the second body comprises an extruded hollow panel including a substantially cylindrical extruded channel that aligns with the hinge channel to form a continuous shaft. A cabinet including such a door assembly is also described.

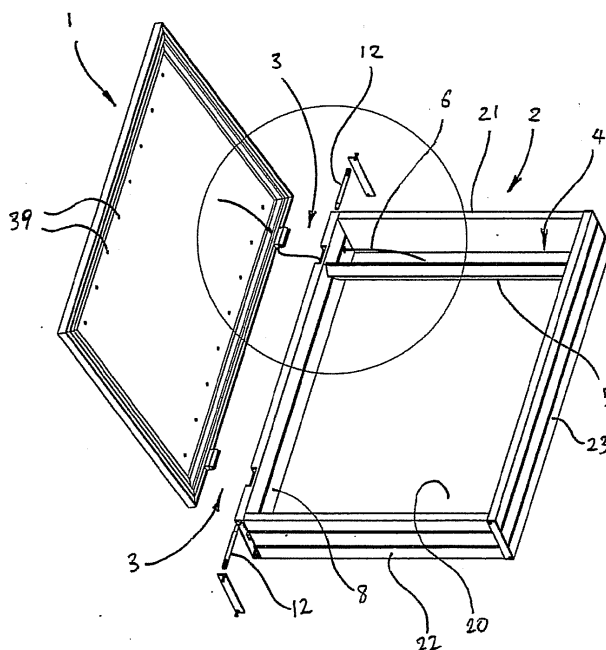


Fig. 2

Description

Technical Field of the Invention

[0001] The present invention relates to a door assembly and to a cabinet making use of such a door assembly.

Background to the Invention

[0002] Illuminated mirrors are popular bathroom fittings that provide a distributed light source around at least part of a periphery of a mirror. They are typically used to ensure good, even and diffuse facial lighting for activities such as applying make-up or shaving, but may also be preferred for purely aesthetic reasons. Illuminated mirror-fronted cabinets conveniently combine valuable discreet storage space for bathroom products with an illuminated mirror, typically provided over a sanitary basin. An illuminated mirror may form a door of the cabinet. In this case, an electrical cable supplying power to the lamps of the illuminated mirror must generally trail between the door and the body of the cabinet, which may be unsightly. Furthermore, such a trailing cable arrangement may be hazardous, and therefore requires careful safety design to prevent water ingress and to prevent accidental snagging of the cable.

[0003] An object of embodiments of the claimed invention is therefore to provide an improved door hinge assembly which prevents snagging of a power cable or other flexible conduit. Another object of embodiments of the claimed invention is to provide an improved cabinet having such a door hinge assembly, so that a concealed power cable or other flexible conduit passing from inside the cabinet body into the door is concealed and protected.

Summary of the Invention

[0004] According to a first aspect of the invention there is provided a door assembly comprising:

- a first body having an internal first cavity;
- a second body comprising a single extrusion which defines an internal second cavity and an extruded channel;
- a hinge element projecting from the first body, the hinge element having an internal hinge channel in fluid connection with the first cavity; and
- a pin projecting from the second body, the pin extending into part of the hinge channel to pivotably secure the hinge element and second body to one another such that the hinge channel aligns with the extruded channel in the second body and forms a fluid connection between the first and second cavities adapted to receive a conduit extending from inside the first cavity to inside the second cavity via the hinge channel, and wherein either of the first and second bodies is a door.

[0005] The door assembly may comprise a flexible conduit extending from inside the first cavity to inside the second cavity via the hinge channel. The conduit may be an electrical cable.

5 **[0006]** The second body may be substantially formed from the single extrusion, and may consist essentially of that extrusion. The extrusion may be an extruded aluminium strip. The extrusion may have an elongate, substantially rectangular cross section. The extruded channel may be generally cylindrical. The pin may extend in the extruded channel.

10 **[0007]** The second body may comprise an opening for accommodating the hinge element.

15 **[0008]** The first body may be a door and the second body may comprise a hollow panel.

20 **[0009]** The pin may have a smooth, substantially cylindrical portion for engagement with the hinge channel, and may have a threaded portion for engagement with a corresponding threaded cavity in the second body. All or part of the extruded channel in the second body may be threaded to receive a threaded portion of the pin. A portion of the pin may define an axis of hinge rotation which is substantially vertical when the door assembly is in use. At least a portion of the hinge channel may be substantially cylindrical, and may be substantially T-shaped.

25 **[0010]** The door assembly may also comprise a second hinge. The second hinge may comprise a second pin, the pin and the second pin being oriented in opposite directions relative to one another. The pin and the second pin may each engage with a respective threaded cavities located at opposite ends of the second body, conveniently by insertion into opposite ends of the second body. The two hinges may be in opposed orientations relative to one another. Each pin may be concealed by a respective faceplate.

30 **[0011]** According to a second aspect of the invention, there is provided a door assembly comprising a door having an internal door cavity, a second body having an internal body cavity, and a hinge having an internal hinge channel, wherein the hinge pivotably secures the door and the body to one another, and wherein the door assembly is adapted to receive a conduit extending from inside the door cavity to inside the body cavity via the hinge channel.

40 **[0012]** According to a third aspect of the invention, there is provided a door assembly comprising a first body having an internal first cavity, a second body having an internal second cavity, a hinge element projecting from the first body and having an internal hinge channel in fluid connection with the first cavity, and a pin projecting from the second body, the pin extending into part of the hinge channel to pivotably secure the hinge element and second body to one another such that the hinge channel is in fluid connection with the second cavity, wherein the door assembly is adapted to receive a conduit extending from inside the first cavity to inside the second cavity via the hinge channel, and wherein either of the first and second bodies is a door.

[0013] Any features of the first aspect of the invention may be combined with either the second or third aspect of the invention.

[0014] According to a fourth aspect of the invention, there is provided a cabinet comprising a door assembly according to any one of the first, second and third aspects of the invention.

[0015] The door may comprise an illuminated mirror. The illuminated mirror may have a lighting circuit concealed within the door, wherein the flexible conduit is an electrical cable connected to the lighting circuit and supplying power thereto. Conveniently, the cabinet may comprise an electric shaver socket, may comprise an internal light, and may comprise one or more proximity sensors operable as light switches. A proximity sensor may be operable to switch on the internal light when the door is opened and to switch off the internal light when the door is closed.

Detailed Description of the Invention

[0016] In order that the invention may be more clearly understood an embodiment thereof will now be described, by way of example only, with reference to the accompanying drawings, of which:

Figure 1 is a front view of a cabinet according to an embodiment of the present invention;

Figure 2 is a partially exploded view of the cabinet of Figure 1, where the cabinet door is open and the hinges are disconnected;

Figure 3 is a detail of the circled area of Figure 2;

Figure 4 is a partially exploded view of the cabinet of Figure 1, where the cabinet door is open and the hinges are partially assembled;

Figure 5 is a detail of the circled area of Figure 4; and

Figure 6 is a partially exploded view of the cabinet of Figure 1, where the cabinet door is open and the hinges are partially assembled, including a cut-away portion of a hinge assembly showing a partial section through the hinge.

Figures 1 to 6 show a bathroom cabinet according to a preferred embodiment of the invention, which has an illuminated mirror for a door. The door (1) is attached to the body (2) of the cabinet by two hinges (3). The cabinet has a compartment (4) formed by an internal divider (5) and the walls of the upper portion of the cabinet body (2).

[0017] The compartment contains electrical circuitry supplying power to the illuminated mirror and to a shaver socket and internal lamp which are both set into apertures

in the internal divider (not shown). The mains power cord that connects this circuitry to a mains power supply enters the cabinet through a small opening in the rear of the compartment (not shown). The compartment is closed by folding the internal divider (5) upward about its hinged edge (5A) and securing its free edge (5B) against the top wall (21) of the cabinet by any suitable fastening means, such as clips or screws. Thus, the majority of the electrical wiring is neatly enclosed within this compartment, which provides a substantially splash-proof enclosure suitable for protecting the circuitry from the wear and tear and damage due to excessive moisture that might be expected in a bathroom environment.

[0018] To provide power to the illuminated mirror forming the cabinet door, a cable (6) connects the door with the body of the cabinet. This cable terminates at one end in the compartment (4) where it is connected to the mains power cord either directly or by way of an internal power circuit contained within the compartment. The other end of the cable terminates inside a cavity formed within the door. In order to protect the cable (6) from damage and hide it from view, the cable follows a tortuous route from the compartment to the illuminated mirror. The cable enters an aperture (7) in a sidewall panel (8) of the cabinet body, the aperture being concealed within the compartment (4), and passes along inside the hollow sidewall to an opening (9) into which a door hinge (3) is connected. The door hinge is constructed as a block (10) with a T-shaped internal channel (11) as shown in the cut-away section of Figure 6. The hinge block is pivotably supported within the sidewall opening (9) by a pin (12) that extends partway into the T-shaped channel. The hinge block is bolted by means of two threaded bores (13) to the illuminated mirror frame (14) that forms a periphery of the door.

[0019] The door is supported on two such hinges, although only the first of these has a cable running through it. The second hinge does not therefore need a T-shaped internal channel to allow a cable to reach into the door; a straight channel, for engagement with the pin, will suffice here. The pin supporting the second hinge may extend fully along the hinge channel, rather than partially as in the case of the first hinge. However, in a preferred embodiment, for the sake of manufacturing simplicity, both hinges are identical with the exceptions that the pins (12) enter the hinges from opposite directions via opposite ends of the sidewall (8) and that only the first hinge contains a cable (6).

[0020] The body of the cabinet is formed substantially from aluminium, although it will be understood that any sturdy material would suffice. The back panel (20) of the cabinet body is an aluminium plate, while the top panel (21), bottom panel (22) and sidewall panels (8, 23) are formed from extruded aluminium strip having a substantially box-shaped cross section. Each wall, or at least the sidewall (8) to which the door is hinged, is formed from extruded aluminium strip having a substantially box-shaped cross section that includes a substantially circular

inclusion forming a substantially cylindrical channel (24) within the extruded strip. This channel is interrupted by the sidewall openings (9) into which each hinge block is inserted, and aligns with the hinge channels to form a continuous vertical shaft through the sidewall and hinge. A respective thread (25) is tapped into this shaft from each end of the sidewall, and each pin has a threaded portion (26) that engages with a respective threaded portion of the shaft when inserted into a respective end of the sidewall shaft to support a respective hinge. Such a threaded pin is shown before insertion in Figures 2 and 3, and partially inserted in Figures 4 to 6. A respective endplate (30) is secured over each end of the sidewall by small screws (31), to conceal the outer ends of the pins and to prevent them from loosening. The endplates also provide a barrier against the ingress of water that might otherwise enter the hinge and displace hinge lubricant and/or cause corrosion.

[0021] Each hinge has a stop in the form of a protruding ridge (35) which opposes and comes to rest against an internal surface of the opening (9) when the door is opened to a selected angle. This angle may be substantially a right angle or may be greater than ninety degrees. The ridge extends parallel to an outer surface of the hinge block (10) that forms the only visible part of the hinge when the door is closed. This outer surface of the hinge block lies flush with an outer surface of the sidewall (8) to substantially close the sidewall opening (9) when the door is closed, while the protruding ridge comes to rest against the internal face of the sidewall's outer surface, giving the hinge a neat appearance and reducing the likelihood of significant fluid ingress.

[0022] The door (1) of the cabinet is formed as an illuminated mirror set into a frame (14) formed from extruded aluminium strip. The frame is constructed and bolted together at the corners, and the hinges are bolted to the frame, via holes (37) bored into the frame that are concealed within the illuminated mirror once the mirror itself is set into the front of the frame. The illuminated mirror is held in place in a recess (38) in the front of the frame by a layer of adhesive. The illuminated mirror is a mirror with transparent windows (39) formed as apertures in the reflective backing, to each of which a light-emitting diode lamp is adhered. Once the lamps and circuitry are secured into the illuminated mirror and the cable connected and fed through the hinge, a second mirror (not shown) is then adhered into a recess (40) in the rear of the frame. This conceals and encapsulates the lamps, circuitry and part of the cable within the door and provides a sturdy structure that is simple to assemble and sufficiently well sealed by the adhesive to resist fluid ingress from splashed water.

[0023] The internal lamp is electrically connected to an infra-red proximity sensor mounted in an aperture of the compartment to face the door. This functions to switch the lamp off when the door is closed and on when the door is open. Optionally, an additional proximity sensor may be electrically connected to a circuit which powers

the illuminated mirror lamps and mounted on an outer surface of the cabinet body so that the front mirror may be illuminated by passing a hand near to the sensor. As would be apparent to the skilled person, alternative switching means such as mechanical switches may be used. In any case it is preferred that all wiring is concealed within the compartment and hollow sidewalls of the cabinet body and within the hollow door, with one or more connecting cables passing unseen from the body to the door via the hinge channel wherever a connection is needed between circuitry in the door and circuitry in the body.

[0024] Shelves, compartments, and/or other fixtures may be affixed inside the cabinet as would be readily apparent to the skilled person.

[0025] As would be understood by the skilled person, a door assembly as described would have applications beyond illuminated mirror bathroom cabinets. In general, any arrangement where concealment is necessary of electrical or other conduits that pass into a door structure may have a door and hinge arrangement similar to that described above.

[0026] The above embodiment is described by way of example only. Many variations are possible without departing from the scope of the invention as defined in the appended claims.

Claims

1. A door assembly comprising:

a first body (1) having an internal first cavity;
a second body (2) comprising a single extrusion which defines an internal second cavity and an extruded channel (24);
a hinge element (3) projecting from the first body, the hinge element having an internal hinge channel (11) in fluid connection with the first cavity; and
a pin (12) projecting from the second body, the pin extending into part of the hinge channel to pivotably secure the hinge element and second body to one another such that the hinge channel aligns with the extruded channel in the second body and forms a fluid connection between the first and second cavities adapted to receive a conduit extending from inside the first cavity to inside the second cavity via the hinge channel, and wherein either of the first and second bodies is a door.

2. A door assembly according to claim 1 comprising a flexible conduit (6) extending from inside the first cavity to inside the second cavity via the hinge channel.

3. A door assembly according to claim 1 or 2 wherein

the second body is substantially formed from the single extrusion.

4. A door assembly as claimed in any preceding claim wherein the pin extends in the extruded channel of the second body. 5

5. A door assembly according to any preceding claim wherein the pin has a threaded portion (26) for engagement with a corresponding threaded cavity in the door assembly. 10

6. A door assembly according to any preceding claim wherein the first body is a door and the second body comprises a hollow panel. 15

7. A door assembly according to any preceding claim wherein the extrusion of the second body has an elongate, substantially rectangular cross section. 20

8. A door assembly according to any preceding claim comprising a second hinge.

10. A door assembly according to claim 8, wherein the second hinge comprises a second pin, and wherein the pin and the second pin are oriented in opposite directions relative to one another. 25

11. A door assembly according to claim 10 wherein the pin and the second pin are each engaged with respective threaded cavities located at opposite ends respectively of the second body. 30

12. A door assembly according to any preceding claim wherein the or each pin is concealed by a respective faceplate (30). 35

13. A door assembly according to any preceding claim wherein the hinge channel is substantially T-shaped. 40

14. A cabinet comprising a door assembly according to any preceding claim.

15. A cabinet according to claim 14 wherein the door comprises an illuminated mirror having a lighting circuit concealed within the door, and wherein the flexible conduit is an electrical cable connected to the lighting circuit and supplying power thereto. 45

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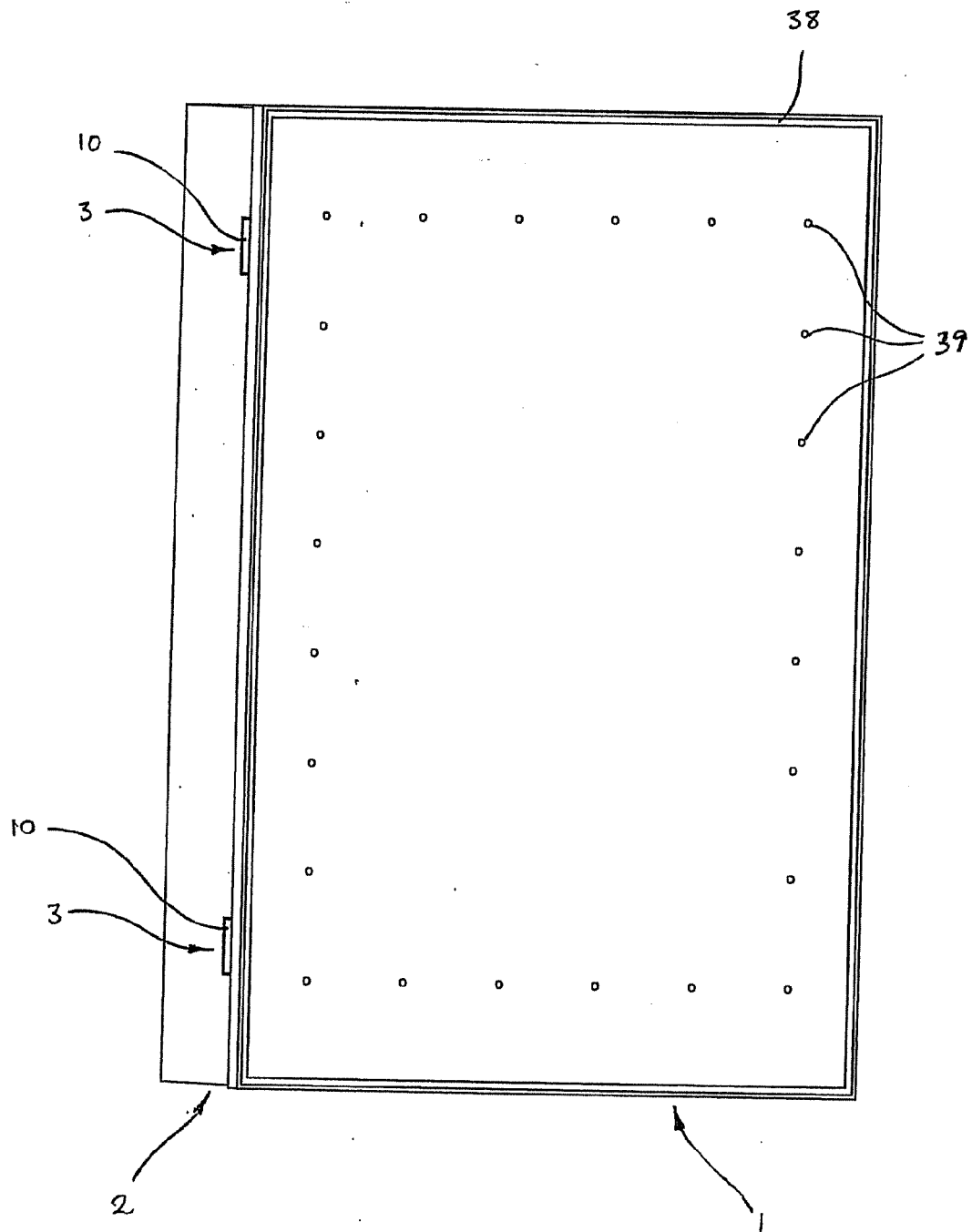


Fig. 1

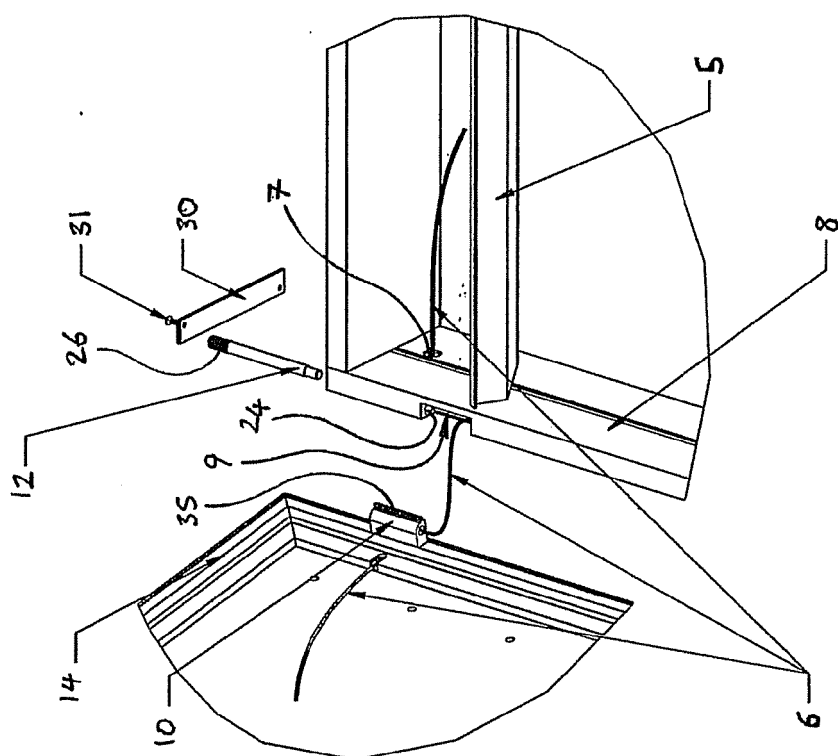


Fig. 3

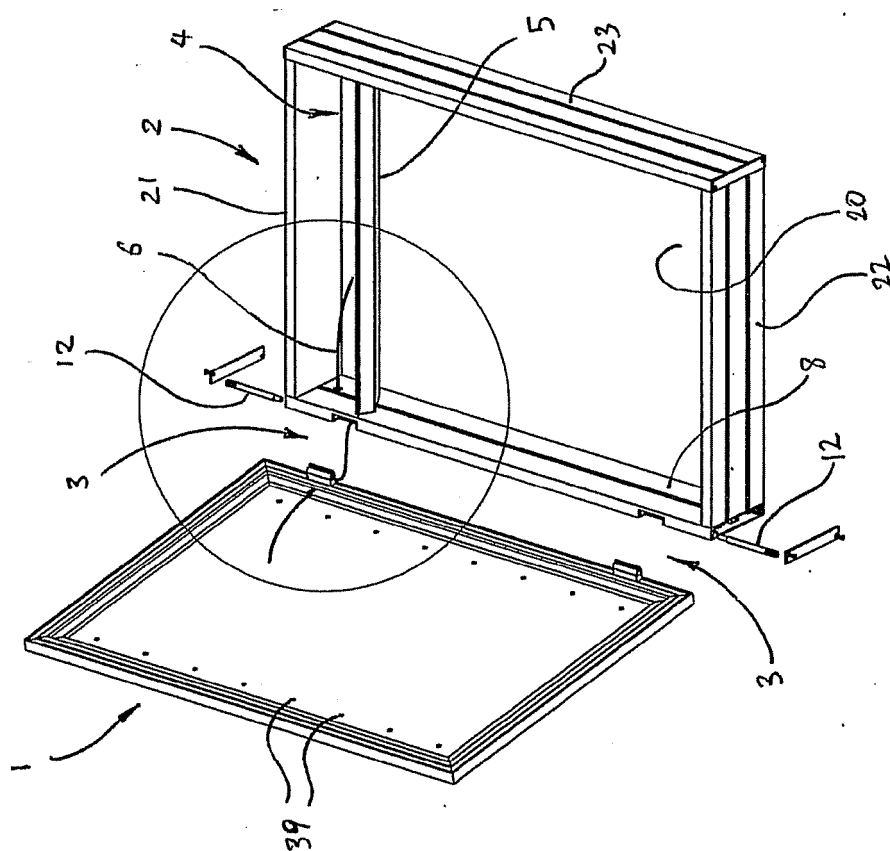


Fig. 2

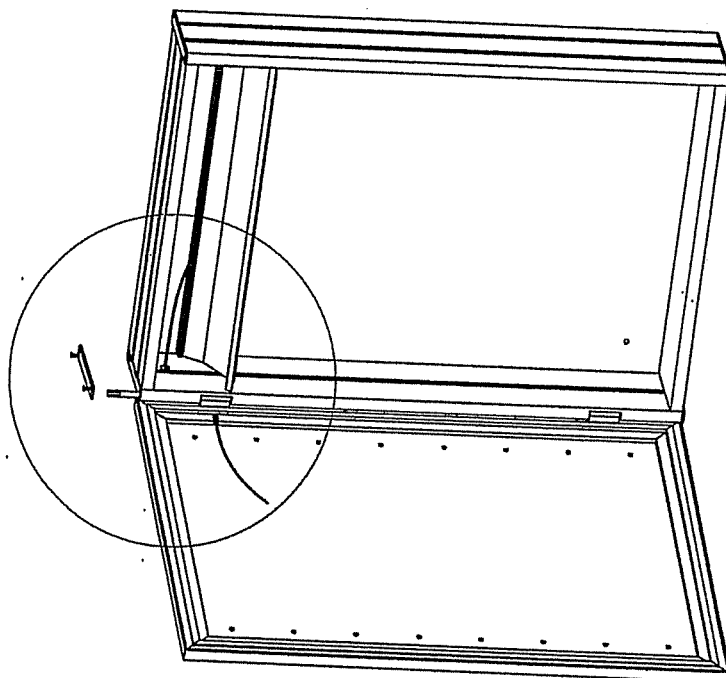


Fig. 4

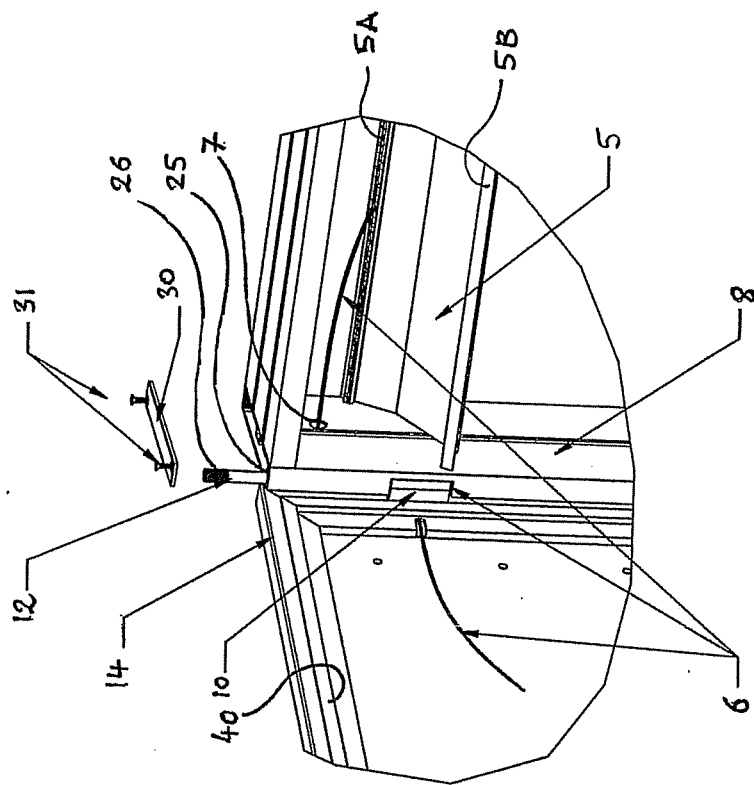


Fig. 5

