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A security barrier

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Abstract

A security barrier is provided including:

a rigid frame such as a frame for a door or window, the frame defining an area to be covered such as by a security screen, the frame including an inwardly facing recess;

a metal screen for covering the area, the screen having an edge to be received in the recess;

an insulator for insertion intermediate the internal surface of the recess and the screen edge to prevent direct contact between the recess and the screen edge; and

clamp means adapted to bear against the recess and against the insulator to secure the screen edge in the recess.

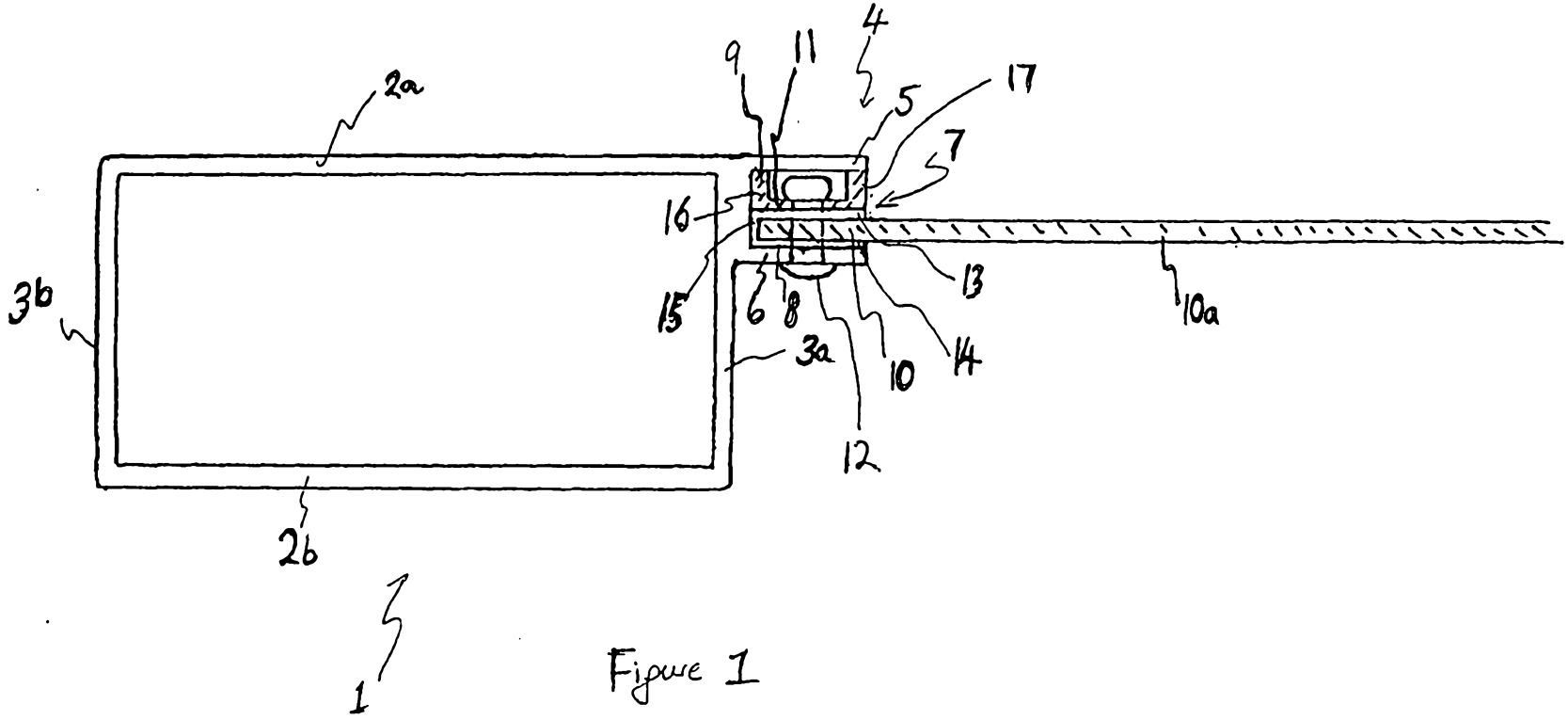

Figure 1

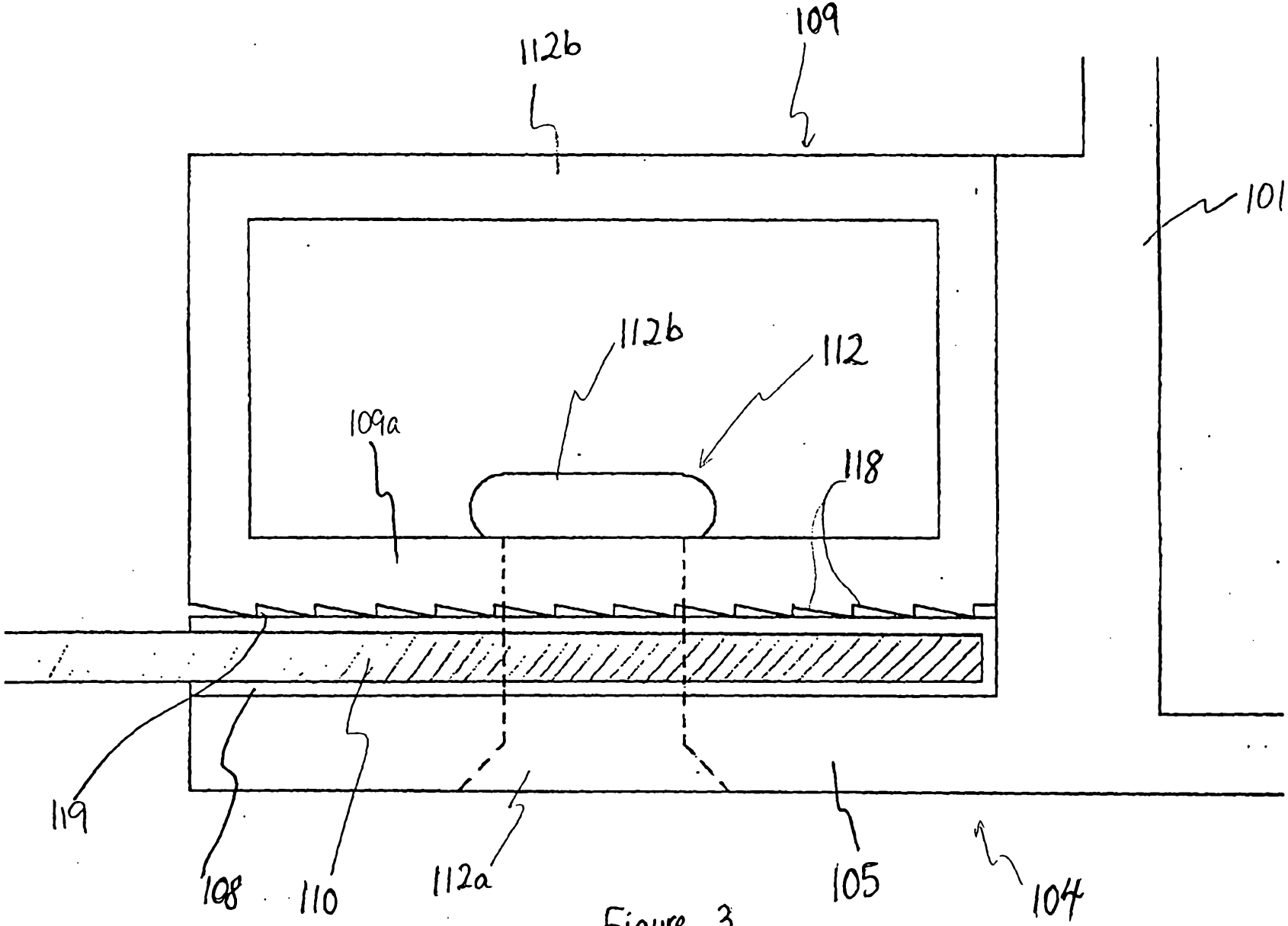

Figure 3

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Invention Title: **A Security Barrier**

The following statement is a full description of this invention, including the best method of performing it known to me/us:

A Security Barrier

This invention relates to a security barrier. More particularly, this invention relates to a security barrier involving the mounting of a security screen to a door or window frame.

Security doors or windows generally have a security barrier such as a grill or an arrangement of bars designed to physically prevent entry of intruders. Typically such security features are fixed in a frame by welds. The frame is then hingedly or slidably mounted within the door or window cavity. The door or window frame may also be fitted with an insect resistant screen. The edges of such screens are mounted on the frame by various means including positive means, such as pop rivets, or friction means, such as securing the edges of the screen in U-shaped channels by means of rubber tubing in the form of a continuous bead located within the channel to hold the screen in place.

More recently, the field has seen the introduction of screens made of woven stainless steel security mesh which serves the dual purpose of providing some form of security together with an insect barrier. The stainless steel mesh is asserted to be of a grade possessing sufficient rigidity and strength to provide a strong deterrent to potential intruders. Such mesh also is claimed to be of sufficient grade to provide an effective barrier to flies, mosquitos and other common insect pests.

Such recent innovations utilise woven stainless steel mesh which may be vulnerable to penetration by a particularly determined intruder. Moreover, such prior art arrangements generally include substantial metal to metal contact of the woven screen to the frame members thereby leaving them vulnerable to corrosive attack.

The above description of the prior art is not intended to be, nor should it be interpreted as, an indication of the common general knowledge pertaining to the invention, but rather to assist the person skilled in the art in understanding the developmental process which lead to the invention.

It is an object of the present invention to improve on, or at least to provide a useful alternative to one or more of the prior art security features described above.

Accordingly, in one aspect of the invention there is provided a security barrier including:

a rigid frame defining an area to be covered and including an inwardly facing recess;

a metal screen for covering said area, said screen having an edge to be received in said recess;

an insulator for insertion intermediate the internal surface of the recess and the screen edge to prevent direct contact between the recess and the screen edge; and

clamp means adapted to bear against said recess and against the insulator to secure said screen edge in said recess.

The clamp means may be integrally formed with the recess structure or may be separately formed.

The frame may be extruded metal. The metal may be any suitable metal or metal alloy. For example, the metal may be aluminium. If iron alloys are used, the frame may be protected against corrosion by covering its surface with a protective covering such as baked enamel.

The frame and the recess may be integrally formed. This is particularly the case where the frame is made from a metal lending itself to such extrusions, for example, aluminium. In an alternative embodiment, the frame and the recess are separately extruded and subsequently fixed together by standard positive fastening means such as riveting, screws, bolts and the like.

The frame may be made of separately extruded linear sections which are bevelled at their ends and joined at their respective ends to form the corners of the frame. Again the

join may be effected by standard fastening means common to the person skilled in the art, such as by riveting, screwing or bolting the respective sections together.

The recess is adapted to receive the screen edge. The recess may define an elongated cavity so oriented to align with the plane of the screen. The recess may be any suitable shape in cross section. For example, the recess may be L-shaped or channel-shaped in cross section. The one or more walls of the recess are preferably suitably dimensioned to prevent the screen from being removed without authorisation by, for example, substantial flexing. The one or more walls of the recess may be planar and joined at angular corners. The one or more walls of the recess may be reinforced for strength. The one or more walls of the recess may be thicker at their base and may taper towards an edge of each channel wall remote from the base.

The clamp means may take any of a number of forms adapted to bear against the recess and the insulator to secure the screen edge. The clamp means may bear against the internal surface of the recess and against the insulator. The clamp means may include one or more fasteners capable of bearing against the recess wall and the main body of the clamp means to sandwich the insulator between the main body and the recess.

The insulator may be dimensioned to fit within the recess together with the clamp means. Where the recess is channel shaped, the clamp means may bear against a first inner surface of the recess and against a first outer surface of the insulator to jam the insulator, and in turn the screen edge, in the recess. Where the recess is L-shaped, the clamp means may be fastened to the recess to secure the screen edge in the insulator.

The clamp means may be a wedge or block. The clamp means may be manually pressed into the recess cavity. Alternatively, the clamp means may be driven into the recess by, for example, a hammer or the like.

The main body of the clamp means may comprise a base. The base may be clamped against the first outer surface of the insulator. The clamp means may include at least one outer wall and a base. Where the recess is channel shaped, the outer wall may be adapted to bridge the gap between an inner surface of the recess and an outer surface of

the insulator. In situ, the base is preferably co-planar with the outer surface of the insulator. The clamp means may be cylindrical whereby the outer wall forms a cylindrical skirt extending from the base.

Preferably, the clamp means is substantially square or channel-shaped in cross section whereby it comprises the base and two opposed substantially parallel outer walls defining a recess therebetween. Preferably, the opposed outer walls are linear and the base is square relative thereto. Where the recess is channel-shaped the base may abut the outer surface of the insulator and the free ends of the outer walls of the clamp means may abut the inner surface of the recess. Alternatively, where the recess is L-shaped, the clamp means clamped by one or more fasteners requires only the base. The clamp means may, however, be square in cross section for aesthetic purposes to obscure the fastener portion on the outer surface of the base from view.

In another embodiment of the invention, the clamp means may form part of the recess. The clamp means may be separately formed relative to the recess. The clamp means may include an insert adapted to be interposed between the recess and the insulator. The clamp means may include cam means to progressively grip the insulator as it is inserted into the recess.

The clamp means may be integrally formed with the recess. The clamp means may form part of the internal surface of the recess. Alternatively, the clamp means is formed separately from the recess and is clamped to the recess.

Preferably, the clamp means includes protrusions adapted to engage an external surface of the insulator. The protrusions may be deflectable, deformable or rigid. The protrusions may be configured to deflect in the direction of insertion of the insulator into the recess.

The protrusions may be relatively rigid. The protrusions may be in the form of one or more teeth. The teeth may be of triangular configuration. The teeth may be angled away from the frame. The teeth are preferably so configured to retard retraction of the insulator from the recess and away from the frame.

The recess wall may itself be deflectable. The clamp means may be adapted to grip the insulator by means of frictional engagement. The clamp means may engage the insulator by means of an interference fit.

The clamp means may be made from the same materials as the recess, particularly in the case where the clamp means is integrally formed with the recess. Alternatively, the clamp means may be made from the same or similar materials to the insulator. Where the clamp means is deformable the material from which it is made will necessarily be resiliently deformable. Where the clamp means is deflectable such deflectability may be achieved either by the structure or configuration of the clamp means or by the material from which it is made.

Accordingly, the clamp means may be formed from a variety of materials including metals such as steel, stainless steel, or other alloys, aluminium, and polymers such as high density polyethylene or polypropylene.

The metal screen may be made from any suitable metal or metal alloy. For example the metal screen may be made from aluminium. Preferably, the metal screen is made from stainless steel for optimal strength and corrosion resistance.

The metal screen may be made using a variety of known methods familiar to the person skilled in the art. For example, the screen may be made from woven or expanded metal. Preferably, the screen is made from expanded metal such as expanded aluminium or stainless steel.

The metal screen may be made in a range of gauges depending on the particular purpose to which the security barrier is to be applied. The metal screen may be adapted to act as a security barrier and as an insect screen. Preferably, the metal screen is of insect screen grade whereby the openings in the screen are small enough to prevent passage of insect pests but sufficiently large to allow an adequate amount of light to penetrate for aesthetic and practical purposes.

Moreover, the metal screen is preferably substantially rigid and not prone to substantial flexing. Preferably, the metal screen is of a degree of rigidity and strength sufficient to satisfy the security product standards set by the relevant authorities in each particular jurisdiction. In particular, the rigidity of the metal screen may be varied depending on the level of security required, the presence or absence of reinforcing means and the size of the area to be covered by the metal screen. For example, a large security barrier such as a door frame may require a metal screen of higher strength and rigidity than a small security barrier such as may be used in a small window.

The expanded metal screen may be formed by means standard in the art. For example, the metal screen may be formed from a metal sheet of suitable dimensions, both in terms of thickness and area covered, and pressed or stamped to expand the metal sheet to create a regular rib pattern defining perforations in the metal as is standard in the art. The perforations may be defined by stamped out or pressed ribs of a variety of configurations. For example, the ribs may be wave like in configuration. To maintain maximum strength, the metal screen may be expanded under conditions of elevated temperature to reduce the incidence of metal fatigue in the finished product.

The perforations may be configured to allow the transverse passage of light through the metal screen normal to the plane of the screen. Alternatively, the perforations may be so oriented to only allow the passage of light transverse to the plane of the screen at an angle of inclination other than normal to the plane of the screen.

The insulator may be made from any suitable material having electrical insulation properties. For example, the insulator may be made using some plastics such as polypropylene or polyethylene, or rubber or rubber composite materials. The material may be made from soft or hard compounds and may be flexible or rigid. Preferably the insulator is made of plastic and is made from substantially rigid and inflexible material such as high density polyethylene or polypropylene.

The insulator may comprise a plurality of separate, regularly spaced components positioned along the length of the recess. For example, the insulator may be comprised

of a plurality of insulator elements. The insulator elements may be regularly spaced along the length of the recess.

However, the insulator is preferably configured to fit within the recess along the entire length of the recess. For example, the insulator may be a unitary piece configured to fit within the recess along its entire length. The insulator is preferably channel-shaped in cross section whereby the insulator defines a cavity having dimensions such that the screen edge fits snugly therein.

Although not essential to the invention, the metal screen will typically have a jagged surface. The jagged surfaced may engage with the inner surface of the insulator in high frictional contact. The internal surface of the insulator may be complementarily jagged. The external surface of the insulator may be complementarily configured to cooperate with the clamp means. For example, the external surface of the insulator may include protrusions and/or indentations whereby to frictionally or positively engage the clamp means. In the case of an expanded metal screen, the high points of the stamped or pressed metal ribs will tend to engage with the inner surface of the insulator in high frictional contact to provide strong non-positive frictional engagement of the screen edge with the insulator.

The insulator is dimensioned and designed to prevent direct contact between the recess and the screen edge. The insulator may suitably be made in a variety of structures. For example, the insulator may be solid, porous, ribbed or perforated. The insulator is preferably solid to allow for an effective weather seal to be applied to the screen edge area. The insulator is preferably dimensioned to sit flush with the inner edge of the recess for aesthetic reasons although this is not necessary for the proper functioning of the security barrier.

In a preferred embodiment the screen edge and insulator are secured in the recess by one or more fasteners forming part of the clamp means. The fasteners may include rivets, screws or bolts. In one embodiment, a shank of the fastener extends from an exterior surface of the recess through a first arm of the recess, through the insulator

surrounding the screen edge, the screen edge itself and through the clamp means, such as the base of the clamp means. The shank is secured at either end by means which are standard in the art. For example, the shank may form part of a pop rivet whereby to positively secure the insulator and screen edge in the recess.

The one or more fasteners may be made from metal as is common in the art. Alternatively, the fasteners are preferably made from insulative material. Preferably, the fasteners are electrically non-conductive. Preferably, the fasteners are made from similar materials to that of the insulator. Preferably, the fasteners are made from high density polyethylene or polypropylene.

The clamp means may comprise a plurality of clamps strategically located intermittently at points in the recess. Alternatively, the clamp means may be an elongate extruded strip extending along some or all of the length of the recess.

So that the invention may be more fully understood and put into practice, a preferred embodiment thereof will now be described with reference to the accompanying drawings in which:

Figure 1 is a schematic transverse view of a portion of a security barrier according to one embodiment;

Figure 2 is a schematic transverse view of a portion of a security barrier according to a second embodiment; and

Figure 3 is a schematic transverse view showing the second embodiment in greater detail.

Referring to the Figure 1, there is shown a transverse section of a portion of a security barrier having a frame 1. The frame 1 is made from extruded aluminium and comprises hollow rectangular tubing having two longer walls 2a and 2b and two shorter walls 3a and 3b.

A recess 4 in the form of a U-shaped channel running substantially the length of a section of the frame 1 is formed integrally with the frame 1. The long wall 2a extends beyond short wall 3a to form a first arm 5 of the recess 4. Intermediate the short wall 3a and extending normal to the short wall 3a and co-planar with the first arm 5 is a second arm 6 of the recess 4. The shortwall 3a together with the first and second arms 5, 6 of the recess 4 define a channel 7.

The frame 1 may be assembled in four sections to define a square or a rectangle (not shown) in which the mouth of the channel 7 faces inwardly towards the mouth of a channel of an opposing section of the frame 1.

Within the channel 7 is inserted a plastic insulator 8. The insulator 8 is made from polypropylene. The insulator 8 includes a mouth facing the same direction as the mouth of the channel 7. The mouth of the insulator 8 is defined by an insulator base 15 adapted to abut the shortwall 3a, together with first and second legs 13, 14 extending normally relative to the insulator base 15 and co-planar with the first and second arms 5, 6 of the recess 4.

Interposed between the first arm 5 and the first leg 13 is one or more clamps 9. The clamps 9 each include a clamp base 11 which is square in configuration and a pair of opposed outer walls 16, 17 extending normally relative to the clamp base 11 whereby, *in situ*, the outer walls 16, 17 bridge the gap between the first leg 13 of the insulator 8 and the first arm 5 of the recess 4. The outer wall 17 sits flush with the end of the first arm 5 and the first leg 13 to provide an aesthetically pleasing finish and, in the embodiment where a unitary clamp means is used for each section of frame, provides weather seal means also.

The periphery or edge 10 of an expanded stainless steel screen 10a is inserted in the insulator 8 along the length of the insulator 8. The clamps 9 are then inserted at regular intervals along the length of the recess 4 whereby, as a result, there is no play in the components jammed within the recess 4.

To further secure the screen edge 10 in the recess 4 there is provided one or more fasteners 12 extending from the external surface of the arm 6 through the second leg 14 of the insulator 8, through the screen edge 10, through the first leg 13 of the insulator 8, and finally through the clamp base 11. The fastener 12 is anchored at both ends to sandwich the intermediate components together in a snug fit secured by positive engagement. In one embodiment, the fastener 12 is a pop rivet. The fastener 12 may also be a screw or bolt threadably received in the clamp base 11. Preferably, the fastener 12 is made from an electrically non-conductive material such as a plastic material. Examples of such materials include high density polyethylene or polypropylene.

The security barrier according to one embodiment of the present invention may be pre-assembled or, alternatively, assembled *in situ*. The four sections of the frame 1 in unassembled state, but with the insulator 8 in place in the recess 4, are brought together around the expanded metal screen 10a to engage therewith. The sections of the frame 1 are then joined by fastening means such as pop rivets at their respective corners with the screen 10a in place. The clamps 9 are then inserted at regular intervals into the recess 4 and fastened to the recess 4 by means of pop rivets 12 to positively secure the screen 10a in place.

In an alternative embodiment, one elongated clamp 9 per recess 4 is inserted in same and secured by a plurality of fasteners spaced along the length of the recess 4.

Referring to Figures 2 and 3, there is shown a second embodiment in the form of a security barrier having a rectangular sectioned frame 101 and an L-sectioned recess 104. In assembled form, the security barrier includes a metal screen 110a, the screen edge 110 of which is inserted into an elongate cross sectionally channel shaped insulator 108. Insulator 108 is made from polypropylene and is substantially rigid. The insulator is sandwiched between an internal surface of recess wall 105 and a clamp 109. Clamp 109 is an elongate rectangular sectioned metal tube, for example, extruded aluminium.

Clamp 109 includes a plurality of fasteners 112 regularly spaced along the length of the clamp 109. The fasteners 112 include a first head 112a adapted to lie flush with the

external surface of wall 105 and an opposed head 112b which may sit proud of the internal surface of base 109a of clamp 109. As opposed head 112b is internal to the clamp 109 it is obscured from view to improve the aesthetic apearance of the security barrier.

As shown most clearly in Figure 3, the external surface of the base 109a includes a plurality of teeth, each comprising a ramp 118 which terminates in a sharp edge 119. The clamp 109 is made of a harder material than the insulator 108 whereby the teeth indent the external surface of the insulator 108 to achieve a highly frictional and/or positive engagement. This makes the retards against the retraction of the insulator 108 from the L-shaped recess 104. The metal screen 110a is in the form of expanded metal and also has a jagged surface which effectively digs into the softer insulator to also effect a highly frictional and/or positive engagement.

Although the invention has been described with reference to a particular preferred embodiment, the person skilled in the art will appreciate that the invention is not to be construed as being limited to that specific embodiment and that other arrangements are contemplated as being within the scope of the invention as described herein.

When construing the specification, the word "comprise" and its derivatives are to be interpreted as having an inclusive meaning unless the context requires otherwise.

The claims defining the invention are as follows:

1. A security barrier including:

a rigid frame defining an area to be covered and including an inwardly facing recess;

a metal screen for covering said area, said screen having an edge to be received in said recess;

an insulator for insertion intermediate the internal surface of the recess and the screen edge to prevent direct contact between the recess and the screen edge; and

clamp means adapted to bear against said recess and against the insulator to secure said screen edge in said recess.

2. A security barrier according to any one of the preceding claims wherein the insulator is an electrical insulator.

3. A security barrier according to any one of the preceding claims wherein the insulator is made from high density polyethylene or polypropylene.

4. A security barrier according to any one of the preceding claims wherein the insulator includes a plurality of insulator elements.

5. A security barrier according to claim 4 wherein the insulator elements are regularly spaced along the length of the screen edge.

6. A security barrier according to any one of claims 1 to 3 wherein the insulator is a unitary piece configured to fit within the recess of one section of the frame along its linear length.

7. A security barrier according to any one of the preceding claims wherein the insulator is a non-perforated, solid structure.

8. A security barrier according to any one of the preceding claims wherein the recess is channel-shaped in cross section and includes a first wall against which the

insulator is adapted to abut and a second wall against which the clamp means is adapted to abut.

9. A security barrier according to claim 8 wherein the clamp means is wedged between the insulator and the second wall of the recess.

10. A security barrier according to any one of the preceding claims wherein the clamp means includes protrusions adapted to frictionally or positively engage with the insulator.

11. A security barrier according to claim 10 wherein the protrusions are in the form of jagged teeth.

12. A security barrier according to any one of the preceding claims wherein the clamp means includes a base clamped to the insulator.

13. A security barrier according to claim 12 when dependent on claim 11 wherein the base includes the jagged teeth.

14. A security barrier according to any one of the preceding claims wherein the clamp means includes at least one fastener.

15. A security barrier according to claim 14 wherein the fastener is made from insulative material.

16. A security barrier according to claim 14 or claim 15 wherein the insulator enclosing the screen edge is sandwiched between the base and an arm of the recess by the operation of the at least one fastener.

17. A security barrier according to any one of the preceding claims wherein the metal screen is adapted to act as a security barrier and as an insect screen.

18. A security barrier according to any one of the preceding claims wherein the metal screen has a jagged surface whereby to engage the inner surface of the insulator in frictional contact.

19. A security barrier according to any one of the preceding claims wherein the metal screen is formed from expanded metal.

20. A security barrier according to any one of the preceding claims wherein the metal screen is formed under elevated temperature conditions to reduce the incidence of metal fatigue and/or failure.

21. A security barrier substantially as hereinbefore described with reference to Figure 1.

22. A security barrier substantially as hereinbefore described with reference to Figures 2 and 3.

23. A method for installing a security barrier according to any one of the preceding claims, the method including the steps of:

a) inserting the insulator into the respective recesses of four separate sections of the frame in an unassembled state;

b) bringing the four sections of the frame together around the metal screen to engage therewith;

c) joining the sections of the frame by fastening means; and

d) inserting the clamping means into the recess.

Dated this 27th day of July 2001

SS Manufacturing Pty Limited

By its Attorneys

Chrysiliou Law

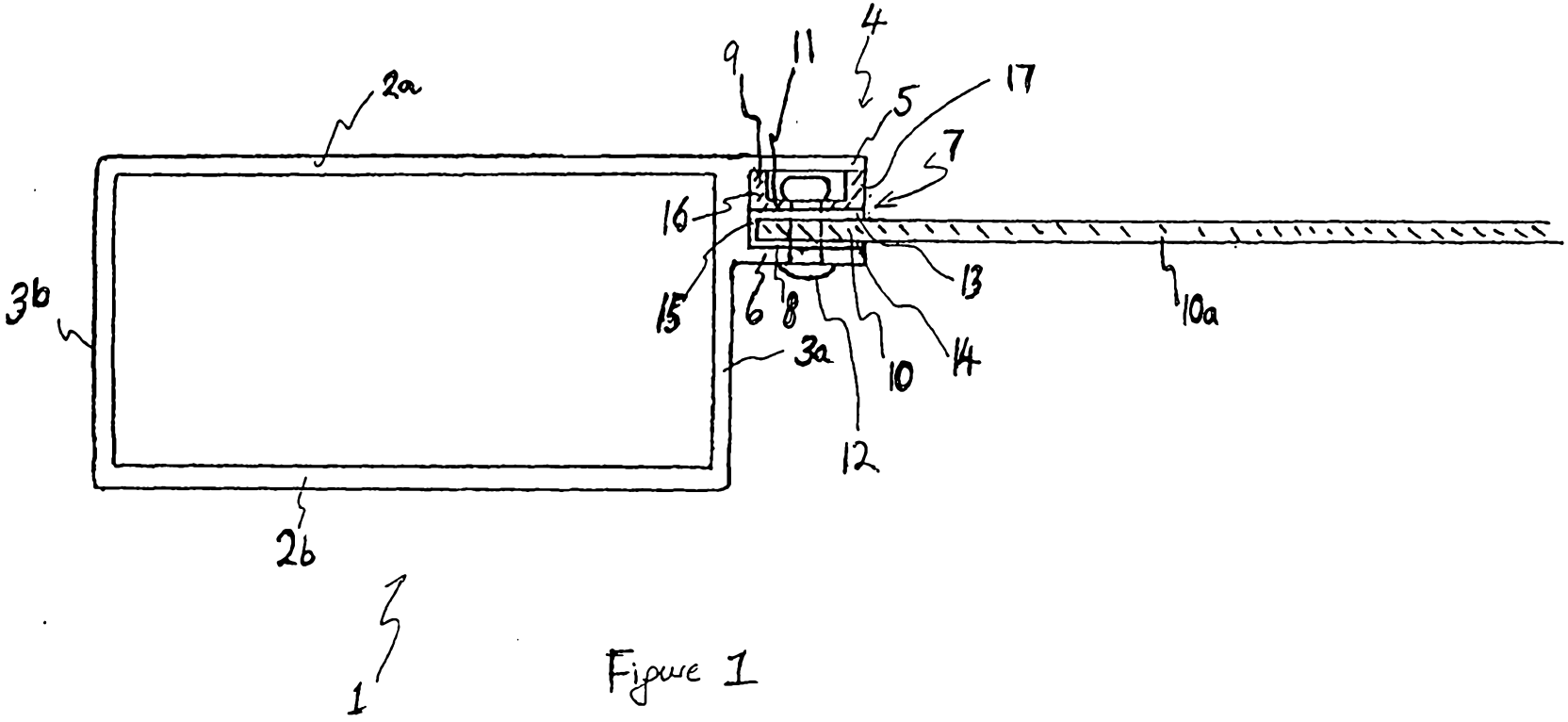
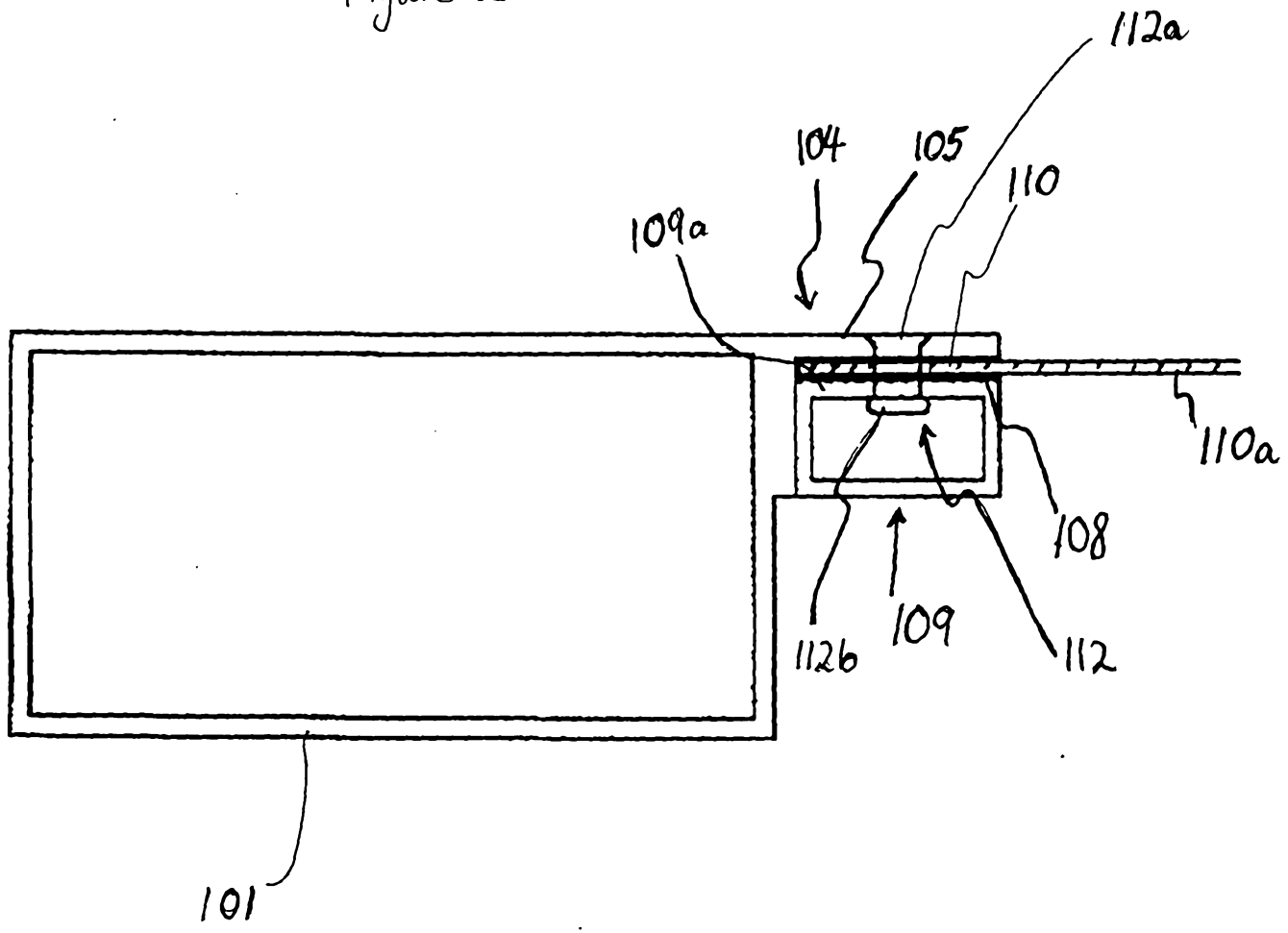


Figure 1

Figure 2



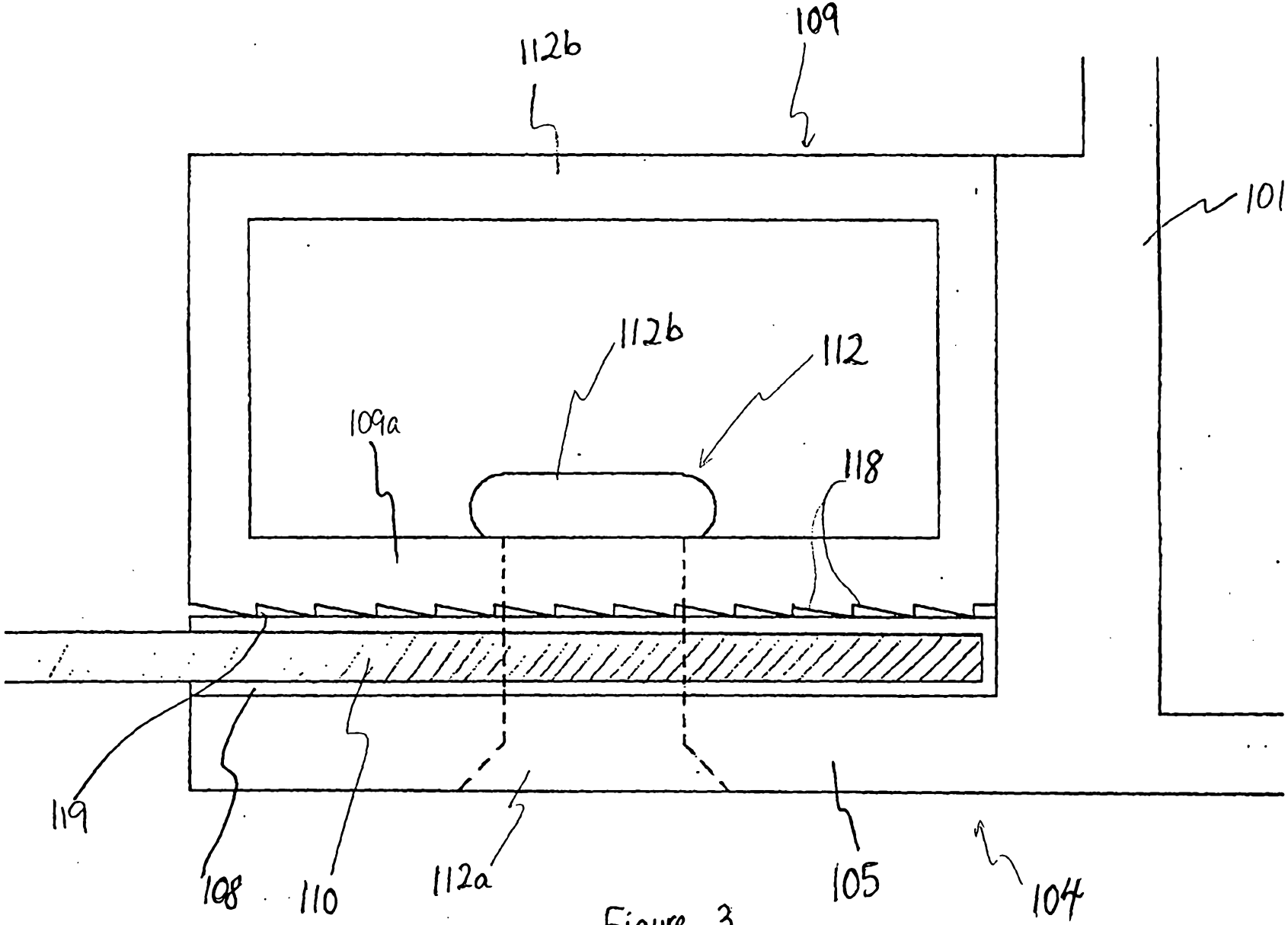


Figure 3