

SECURITY FENCING ASSEMBLY AND FASTENER**FIELD OF THE INVENTION**

- 5 Embodiments of the present invention relate to a security fencing assembly. In particular, they relate to a security fastener for a security fencing assembly.

BACKGROUND TO THE INVENTION

- 10 Security fencing assemblies are fencing assemblies which are designed to lengthen the time required for an attacker to create an opening in the fencing assembly, and/or increase the sophistication of the tools that the attacker would have to carry.

15 **BRIEF DESCRIPTION OF VARIOUS EMBODIMENTS OF THE INVENTION**

According to various, but not necessarily all, embodiments of the invention there is provided a security fencing assembly comprising:

- 20 a pair of spaced ground engaging posts;
- a plurality of elongate members located between the ground engaging posts to collectively provide a barrier; and
- a plurality of fasteners to secure the barrier between the ground engaging posts,
- wherein each fastener comprises a threaded shaft engageable with a
- 25 respective mating threaded component,
- wherein the threaded shaft comprises a metal portion and a polymer patch portion both located to be in simultaneous threaded contact with the mating threaded component.

- 30 According to various, but not necessarily all, embodiments of the invention there is provided a security fencing assembly comprising:
- a pair of spaced ground engaging posts;

a cross member extending between the pair of spaced ground engaging posts;

a plurality of elongate pale members located between the ground engaging posts and extending upwardly to collectively provide a barrier; and

5 a plurality of fasteners each fastening one of the elongate pale members to the cross member,

wherein each fastener comprises a threaded shaft engageable with a respective mating threaded component,

10 wherein the threaded shaft comprises a metal portion and a polymer patch portion both located to be in simultaneous threaded contact with the mating threaded component.

This provides the advantage of a secure fencing assembly. The polymer patch portion may be layered (thinly) on the metal portion, acting as a wedge to fill
15 any tolerance between the threaded shaft and the mating threaded component to increase the prevailing torque. Polymer patches are used as anti-vibration products on fasteners for industrial machines. However, the present inventor(s) in the field of security fencing have discovered that such patches are useful in security fencing against a recently-discovered, obscure attack mechanism that
20 relies on reducing or removing the load from the fasteners. The polymer patch portion will ensure that the minimum prevailing torque required to loosen the fastener remains high, even when the fastener is under no longer under load.

The metal portion of the threaded shaft may comprise stainless steel, titanium,
25 or aluminium. The material is intentionally selected because it is more prone to galling than other metals or alloys such as annealed steel or fully hardened steel.

An advantage is further improved security because the metal portion of the
30 threaded shaft will friction-weld to the mating threaded component, and the polymer patch portion will synergistically assist with this by increasing the normal force therebetween to increase the galling effect. This runs counter to

the usual design process of minimising galling by selecting different galling-resistant and/or increasing mechanical tolerances.

The galling tendency may be further increased in one or more of the following ways:

- the stainless steel may be an austenitic class of stainless steel such as class A2 (also known as type 304 or 18/8) or A4 (also known as type 316 or 18/10);
- each fastener may be unlubricated when engaged with the respective mating threaded component;
- each fastener may be formed from substantially the same alloy grade of metal as the respective mating threaded component (e.g., both A2 or both A4).

Each fastener may further comprise the respective mating threaded component. The mating threaded component may be in the form of a shear nut comprising a nut portion breakably coupled to an anti-tamper portion.

Each fastener, may be dimensioned such that when the nut portion of the shear nut breaks off from the anti-tamper portion, the anti-tamper portion is in simultaneous threaded contact with the polymer patch portion and the metal portion of the threaded shaft. The anti-tamper portion may be substantially aligned with the polymer patch portion and the metal portion of the threaded shaft

An advantage is further improved security, because the shear nut is attack-resistant once fitted. This is because once the nut portion has snapped off, the metal portion of the threaded shaft is wedged against the threads of the anti-tamper portion of the shear nut by the polymer patch portion of the threaded shaft.

An advantage of the various fastener features described above, used in combination, is that they each work to significantly improve attack-resistance while adding very little to the cost and manufacturing complexity of the fastener.

The nut portion of the shear nut may comprise a tool-receiving portion. For example, at least part of the nut portion may be hex-shaped or may comprise a tool socket.

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The anti-tamper portion of the shear nut may have a tool-resistant shape, resistant to being engaged by a fastener-loosening tool. Examples of fastener-loosening tools include spanners, screwdrivers, or socket wrenches. The anti-tamper portion may have a rounded outer surface to prevent a spanner or
10 socket from being engaged with the perimeter. For example, the rounded outer surface of the anti-tamper portion of the shear nut may be frustoconical and/or dome-shaped. The term 'cone nut' may be colloquially used to describe the anti-tamper portion.

15 The shear nut may have a nominal breaking torque in the order of magnitude of tens of Newton-metres, such as 10-50Nm, or 20-40Nm, e.g., approximately 30Nm.

The elongate members may be elongate pale members located between the
20 ground engaging posts and extending upwardly to collectively provide the barrier. The security fencing assembly may comprise a cross member extending between the pair of spaced ground engaging posts. The fasteners may each fasten one of the elongate pale members to the cross member. Each of the elongate pale members may be shaped to define a recess in which the
25 respective fastener is received.

Each fastener may further comprise a head connected to the threaded shaft.

The head may be received in the recess.

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The head may have an elongate aspect ratio when viewed in a plane in which the fastener is rotatable. The elongate aspect ratio of the head may be

dimensioned relative to the recess to resist rotation of the head within the recess. For example, the elongate aspect ratio may be $>1.2:1$.

Where the recess may be elongate, the head may have a length facing along the elongate recess, the length of the head being greater than a width of the recess to prevent rotation of the head within the recess.

The recess may be deeper than a thickness of the head. The recess may be defined by a pair of sloped side surfaces and a base surface therebetween. For example, the recess may be U-shaped.

The head may comprise an underside to which the threaded shaft is connected, the underside of the head comprising sloped underside portions. When the fasteners are within the recesses, the sloped underside portions of the head may be mostly parallel or parallel to the pair of sloped side surfaces of the recess. For example, the underside of the head may be U-shaped as defined by the sloped underside portions of the head.

An advantage is that security is further improved because the underside of the head conforms to the shape of the recess, to minimise the gap between the head and the recess, so that it is difficult to insert a crowbar or similar tool into this gap.

The head may have a tool-resistant shape, resistant to being engaged by a fastener-loosening tool. The head may have a rounded perimeter (e.g., edge) to prevent a spanner or socket from being engaged with the perimeter. The head may have a tool-resistant upper surface, to prevent screwdriver or key engagement.

The head may have a variable thickness in multiple orthogonal planes, each orthogonal to the plane in which the head is rotatable, to define the tool-resistant shape. The variable thickness may be to conform to a shape of the recess.

For example, the rounded perimeter of the head may have a variable elevation along its length. The rounded perimeter of the head may be shaped to meet the base surface of the recess to resist prising and may be shaped to meet the sloped side surfaces of the recess to resist prising.

An advantage is that security is further improved because the gap between the head and the recess is minimised around the circumference of the head.

The recess may be an elongate recess. The head may have a lower surface that is convex (e.g., U-shaped underside) when viewed in a first one of the orthogonal planes, extending across the elongate recess. The convex shape may be defined by the sloped underside portions. The lower surface may be generally flat/linear when viewed in the second one of the orthogonal planes, extending along the elongate recess.

The head may have an upper surface that is convex (e.g., arch shaped topside) when viewed in the second orthogonal plane extending along the recess. The upper surface may be generally flat/linear when viewed in the first orthogonal plane.

The upper surface of the head may be directly connected to the lower surface of the head by the rounded perimeter (rounded edge), the upper surface being convex/arch shaped. An advantage is that the head lacks straight side surfaces and is therefore resistant to engagement with gripping tools such as mole grips or pliers.

In some examples, the head may define a saddle shape, also referred to as a hyperbolic paraboloid shape. In some examples, the lower surface and upper surface may define the saddle shape.

Each elongate pale member may define an elongate W profile. The recess may be a central recess of the elongate W profile.

5 The polymer patch portion may define a prevailing torque selected from the 2Nm to 15Nm, or 3Nm to 8Nm. This range ensures that the connection is secure, ensures the mating threaded component does not spin, and ensures that the elongate pale member is not deformed when the fastener is at an operating tightness.

10 The polymer patch portion may be formed from nylon, but is not limited to nylon. Other materials could be used such as polyphthalamide.

The polymer patch portion may extend around part of each thread of a plurality of threads of the threaded shaft, for example by no more than half a thread turn.
15 This ensures that the opposite half of the thread presents the exposed metal portion which is urged against the counter-threads of the mating threaded component.

The threaded shaft may comprise a shank portion and a threaded portion. A
20 length of the shank portion may be approximately equal to a sum of hole depths through the cross member and the elongate pale member.

The fasteners may be arranged such that a recessed portion of each fastener is front-facing and a protruding portion of each fastener is rear-facing. In some,
25 but not necessarily all examples, the recessed portions may be the heads in the recesses, and the protruding portions may be the mating threaded components.

This is advantageous because the easy-to-reach (front) portions of the
30 fasteners are recessed and therefore easier to protect from cutting tools, whereas the protruding portions of the fasteners are protected from cutting tools by virtue of being hard to reach as they are located to the secure/rear side of

the security fencing assembly. The narrow gaps between adjacent elongate pale members makes it difficult to manoeuvre a cutting tool to the rear side of the security fencing assembly.

- 5 The terms 'front' and 'rear' are clear in the context of security fencing assemblies, because 'rear' refers to the secure side of the security fencing assembly.

10 The cross member to which the elongate pale members are secured may comprise an upright section and a transverse section extending transverse to the upright section. The upright section may comprise holes for the fasteners, and the transverse section may protrude from the upright section by a further distance than the distance by which the protruding portions (e.g., mating threaded components) of the fasteners protrude. In examples, the upright
15 section may be an upright leg and the transverse section may be a transverse leg.

An advantage is that the shape of the transverse section of the cross member provides overall stiffness and further obscures the protruding portions of the
20 fasteners to protect them from sawing attacks.

At least some of the fasteners may secure the respective elongate pale member to a front face of the cross member.

25 The fasteners may secure the respective elongate pale member to a pair of vertically-separated cross members, including the cross member described above. Therefore, the upper and lower halves of each elongate pale member may be secured to a corresponding cross member.

30 According to various, but not necessarily all, embodiments of the invention there is provided a security fastener comprising:
a mating threaded component;

a threaded shaft engageable with the mating threaded component; and
a head connected to the threaded shaft,
wherein the threaded shaft comprises a metal portion and a polymer
patch portion arranged to be in simultaneous threaded contact with the mating
5 threaded component,
wherein the mating threaded component comprises a shear nut
comprising a nut portion breakably coupled to an anti-tamper portion,
wherein the anti-tamper portion is aligned with the polymer patch portion
and the metal portion of the threaded shaft when the shear nut reaches an end
10 of a threaded portion of the threaded shaft.

According to various, but not necessarily all, embodiments of the invention
there is provided a security fastener comprising:

a mating threaded component;
15 a threaded shaft engageable with the mating threaded component; and
a head connected to the threaded shaft,
wherein the threaded shaft comprises a metal portion and a polymer
patch portion arranged to be in simultaneous threaded contact with the mating
threaded component,
20 wherein the head has a tool-resistant shape and is shaped to conform
with the shape of an elongate recess in an elongate member, and
wherein the head has an elongate aspect ratio of $>1.2:1$.

The security fastener may be a 'security fencing fastener'. The security fastener
25 may be for a fastener use in security fencing assemblies.

According to various, but not necessarily all, embodiments of the invention
there is provided a security fencing assembly comprising the security fastener
defined above.

30 Further optional features of the security fastener (fastener) are defined in the
preceding statements.

BRIEF DESCRIPTION OF THE DRAWINGS

For a better understanding of various examples of embodiments of the present invention reference will now be made by way of example only to the accompanying drawings in which:

FIG. 1 illustrates a front view of an example security fencing assembly;

FIG. 2 illustrates a cross-section of an example elongate pale member;

FIG. 3 illustrates a side detail view of an example security fencing assembly;

FIG. 4 illustrates a perspective view of an example male part of a fastener;

FIG. 5 illustrates a perspective view of an example fastener; and

FIG. 6 illustrates a top cross-section view of fasteners connecting elongate pale members to a cross member.

DETAILED DESCRIPTION OF VARIOUS EMBODIMENTS OF THE INVENTION

FIG. 1 illustrates an example security fencing assembly 100 in the form of a metal palisade fencing assembly.

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In the Figures, the x-axis is a front-rear horizontal axis extending from the front of the security fencing assembly 100 to the secure rear of the security fencing assembly 100. The y-axis is a lateral horizontal axis extending parallel to the security fencing assembly 100. The z-axis is a vertical axis extending upwardly from the ground.

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The security fencing assembly 100 comprises a pair of spaced ground engaging posts 102, extending upwardly in the z-direction.

Each ground engaging post 102 is mounted to the ground, for instance in a concrete footing 108 as shown. Each ground engaging post 102 may either be

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embedded in a concrete footing 108, or bolted to the concrete footing 108, for example.

Each ground engaging post 102 can be formed from a metal profile such as a steel hollow section, or another appropriate metal geometry. Each ground engaging post 102 may have a minimum yield strength of S235 as defined in structural standards.

Although only two ground engaging posts 102 are shown, a complete security fencing assembly 100 can comprise several additional ground engaging posts 102 to at least partially surround a facility to be protected from trespassers.

The security fencing assembly 100 further comprises cross members 104 (cross bars). FIG. 1 illustrates two cross members 104 extending horizontally in the y-direction between the pair of ground engaging posts 102. However, a different number of cross members 104 could be provided between each pair of ground engaging posts 102.

A lower cross member 104 is located in a lower half of the security fencing assembly 100, and an upper cross member 104 is located in the upper half of the security fencing assembly 100. The cross members 104 extend generally parallel to each other.

Each cross member 104 can be formed from a metal profile such as a steel hollow section, or another appropriate metal geometry. Each cross member 104 may have a minimum yield strength of S235 as defined in standards.

Each cross member 104 is structurally connected at each end to a respective ground engaging post 102.

The security fencing assembly 100 further comprises a plurality of elongate pale members 106 located between the ground engaging posts 102 and each extending vertically upwardly in the z-axis to collectively provide a barrier 1.

- 5 Each elongate pale member 106 is connected to each of the cross members 104.

The number of elongate pale members 106 is several times greater than the number of ground engaging members, to collectively provide a barrier 1. The
10 number of elongate pale members 106 between the pair of ground engaging posts 102 may be selected from the range 7 to 26 elongate pale members 106, depending on how close or far apart the ground engaging posts 102 are.

The upper half of each elongate pale member 106 is secured to the upper cross
15 member 104, and the lower half of each elongate pale member 106 is secured to the lower cross member 104.

Where the elongate pale members 106 are each supported by two or more cross members 104, it is possible for the elongate pale members 106 to be
20 suspended above the ground. FIG. 1 shows a gap underneath each suspended elongate pale member 106.

Each elongate pale member 106 can be formed from a metal profile such as a steel hollow section. Each elongate pale member 106 may have a minimum
25 yield strength of S235 as defined in standards.

Alignable holes 110 are provided towards upper and lower ends of the elongate pale members 106 to permit mounting of the elongate pale members 106 to the upper and lower cross members 104. The holes 110 in the elongate pale
30 members 106 can be aligned with corresponding holes in the cross members 104.

A spike configuration 112 is provided on the upper end of each elongate pale member 106, to deter persons from climbing over the security fencing assembly 100.

- 5 FIG. 2 illustrates a cross-section through a single elongate pale member 106. As shown, an elongate pale member 106 can define an elongate W profile, to provide geometric stiffness. Alternative geometries include, but are not limited to D-sections and L-sections (angle sections).
- 10 The elongate W profile comprises a middle, forward-facing recess 202 between a pair of rearward-facing recesses 203. Each recess 202, 203 could be described as U-shaped.

The illustrated geometry comprises flats in the y-direction, including the base surface labelled 204. The flats are interconnected by sloped side surfaces 206, collectively defining a W-shape. The angle of the sloped side surfaces 206 may be from the range 30 to 85 degrees. However, elongate W profiles can vary in geometry.

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- 20 Therefore, in FIG. 2, each recess 202, 203 is defined by a pair of sloped side surfaces 206 and a base surface 204 therebetween. The base surface 204 of the middle recess 202 is flat enough to act as a bearing surface for the fastener 300.

- 25 FIG. 3 illustrates a side detail view of the security fencing assembly 100, showing a cross-section through one of the cross members 104.

The detail view in FIG. 3 illustrates the cross member 104 being an L-section comprising an upright leg 302 and a transverse leg 304 extending transverse to the upright leg 302. It would be appreciated that the cross member 104 is not limited to being an L-section.

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The upright leg 302 of the cross member 104 comprises holes with which the upper or lower holes 110 in the elongate pale members 106 are alignable. The transverse leg 304 protrudes rearwardly from the upright leg 302.

- 5 The detail view in FIG. 3 further illustrates a fastener 300 securing the elongate pale member 106 to the front face of the cross member 104. The front face of the cross member 104 is defined in FIG. 3 as the front-facing surface of the upright leg 302 of the cross member 104. A plurality of the fasteners 300 attach each of the elongate pale members 106 to each of the cross members 104.

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The advantageous design of the fasteners 300 is now described in detail, with reference to FIGS. 4-6. The illustrated fastener 300 comprises a bolt 400, and a mating threaded component in the form of a shear nut 500.

- 15 FIG. 4 illustrates a perspective view of a bolt 400 of the fastener 300. FIG. 5 illustrates the bolt 400 connected to a mating threaded component in the form of a shear nut 500. FIG. 6 illustrates the fasteners 300 connecting elongate pale members 106 to a cross member 104.

- 20 FIG. 4 illustrates each bolt 400 comprising a head 406 connected to a threaded shaft 416. The threaded shaft 416 comprises a shank portion 418 (unthreaded/shoulder portion) and a threaded portion 420. In other examples, the threaded shaft 416 may be fully threaded, without a shank portion 418.

- 25 FIG. 5 further illustrates the shear nut 500, mounted to the threaded portion 420 of the threaded shaft 416. The shear nut 500 comprises a nut portion 502 breakably coupled to a frustoconical anti-tamper portion 504.

- 30 The illustrated nut portion 502 of the shear nut 500 comprises a tool-receiving portion 506 in the form of a hex-shaped outer surface.

When the shear nut 500 reaches an operating tightness by abutting against the shank portion 418, the nut portion 502 breaks off the anti-tamper portion 504. The nominal breaking torque of the shear nut 500 may be 30Nm, or another value from the range 10-50Nm or 20-40Nm.

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The right side of FIG. 6 shows that once the nut portion 502 has broken off, the anti-tamper portion 504 remains secured to the bolt 400 and cannot be easily gripped by a tool because it has a tool-resistant frustoconical shape.

10 In an implementation, the fastener 300 deforms the middle section (recess 202) of the elongate pale member 106 when tightened. When further tightened, the shear nut 500 comes into contact with the shank portion 418 of the bolt 400 and snaps off before the mid-section of the elongate pale member 106 comes into contact with the cross member 104 leaving a small gap (e.g., between 1 to
15 2mm) between the elongate pale member 106 and cross member 104. The small gap ensures that the nut portion 502 will reach the shank portion 418 and break, even if the parts 104, 106 are out of tolerance. It also reduces the likelihood that an installer will tighten a fastener 300 to what feels like full tightness, without the shear nut 500 breaking.

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To further assist with permanent retention of the shear nut 500, the materials may be specified to a) promote tolerance between the bolt 400 and the shear nut 500, and b) promote galling between the bolt 400 and the shear nut 500.

25 As shown in FIG. 4, the surface of the threaded portion 420 of the threaded shaft 416 of the bolt 400 comprises both a metal portion 402 and a polymer patch portion 404.

The metal portion 402 is an exposed metal surface portion and the polymer
30 patch portion 404 is an exposed polymer surface portion. The polymer patch portion 404 may be a thin coating layered on top of part of the underlying metal threads.

In an implementation, the polymer patch portion 404 is formed from Nylon and the metal portion 402 is formed from stainless steel. The whole bolt 400 may be formed from the stainless steel. Therefore, the metal portion 402 refers to the threads that aren't covered by a polymer patch portion 404.

The illustrated polymer patch portion 404 is a rounded/circular dot at a first side of the threaded portion 420 of the bolt 400, covering part of multiple threads of the threaded portion 420. The rest of the threaded portion 420 of the bolt 400 that presents exposed metal is the metal portion 402.

The polymer patch portion 404 may be positioned to begin after one or more complete uncoated threads.

While the shear nut 500 is being fastened to the bolt 400, the threads of the shear nut 500 engage with the corresponding threads of the polymer patch portion 404 at the first side of the threaded portion 420 of the bolt 400.

The added thickness of the polymer patch portion 404 removes the tolerance between the threads of the shear nut 500 and threads of the metal portion 402, at the second side of the threaded portion 420 opposite the first side where the polymer patch portion 404 is located.

Therefore, the metal portion 402 and polymer patch portion 404 at opposing sides of the threaded portion 420 of the bolt 400 are in simultaneous threaded contact with the threads of the shear nut 500. Where stainless steel may be used for the bolt 400 and shear nut 500, this further promotes localised galling between the shear nut 500 and the second side of the threaded portion 420 of the bolt 400.

To further promote galling, the stainless steel may be an austenitic class of stainless steel, and may be a more galling-prone grade such as grade A2.

Alternative galling-prone materials include aluminium or titanium. The same grade of metal may be used for both the metal portion 402 of the threaded portion 420 and the shear nut 500, to further promote galling. The fastener 300 may also be unlubricated when the shear nut 500 is fastened to the bolt 400.

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As shown in FIGS. 4 and 5, the polymer patch portion 404 is aligned with, and substantially overlaps the anti-tamper portion 504 of the shear nut 500, when the anti-tamper portion 504 abuts the shank portion 418. Therefore, the anti-tamper portion 504 is even harder to remove due to the high prevailing torque caused by the polymer patch portion 404 and localised galling effect, even when the fastener 300 is not under load. In an implementation, the prevailing torque is from the range 3Nm to 8Nm.

FIGS. 4-6 also illustrated that the head 406 of the bolt 400 is shaped to conform to the shape of the recess 202 of the elongate pale member 106.

FIG. 4 shows that the head 406 of the bolt 400 has a lower surface 408 at its underside, and an upper surface 414 at its upper side.

The lower surface 408 of the head 406 is convex/U-shaped in the x-y plane, to conform to the U-shaped recess 202 of the elongate pale member 106. The lower surface 408 of the head 406 comprises sloped underside portions 410 which are sloped in the x-y plane to define the convex shape, and to extend mostly parallel (e.g., within 45 or within 30 degrees) of the sloped side surfaces 206 of the recess 202.

The upper surface 414 of the head 406 is convex/arch shaped in the x-z plane. Therefore, the upper surface 414, the lower surface 408, and the rounded perimeter edge 412 connecting them, define a saddle shape also referred to as a hyperbolic paraboloid shape.

This saddle shape of the head 406 ensures that the perimeter edge of the head 406 meets/is proximal to the surfaces 204, 206 of the recess 202 around its whole circumferential length, to resist insertion of a prising tool (such as a crowbar or flat head screwdriver).

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The continuously curved shape of the upper surface 414 of the head 406, and lack of side surfaces, also provides resistance to engagement of the head 406 with gripping tools such as pliers or mole grips.

10 These characteristics provide the head 406 of the bolt 400 with a tool-resistant shape.

Further, as shown in FIGS. 4-5, the head 406 of the bolt 400 has an elongate aspect ratio, having a longer z-axis length parallel to the recess 202, than its y-axis width across the recess 202. Therefore, the head 406 of the bolt 400 cannot be rotated within the recess 202. The z-axis length of the head 406 may be at least 1.1 or at least 1.4 times greater than the y-axis width of the head 406.

20 Further, as shown in FIG. 6, the head 406 is substantially thinner than the depth of the recess 202 of the elongate pale member 106, so the head 406 is sunken/recessed and therefore hard to engage.

Recessing the heads 406 of the fasteners 300 is useful because the heads 406 of the fasteners 300 are exposed at the front of the security fencing assembly 100, and are therefore more vulnerable than the shear nut 500s which are at the rear side which can only be reached through the narrow gaps between the elongate pale members 106.

30 In another implementation, the heads 406 of the bolts 400 of the fasteners 300 are not recessed and may protrude. In such an implementation, the bolt 400 may be configured as a shear bolt where the head 406 comprises a tool-

receiving portion breakably coupled to an anti-tamper portion of the head 406. This ensures that the bolt 400 cannot subsequently be undone. The tool-receiving portion can be hex shaped and/or can comprise a socket. The anti-tamper portion can be generally washer shaped and/or cone shaped, and
5 remains connected to the threaded shaft 416.

Shear bolts with breakable heads are advantageous for all types of security fencing assembly 100, but particularly where the security fencing assembly 100 is a mesh fencing assembly lacking suitable recesses for the heads, or where
10 the elongate pale members are flat or flatter and lack suitable recesses.

If the security fencing assembly 100 is a mesh fencing assembly, the barrier 1 is a panel formed from elongate members (wires) woven, knitted, expanded, sintered, etched, or electroformed into a mesh shape. The mesh barrier is
15 attached directly to the ground engaging posts 102 by fasteners 300. If cross members 104 are provided, the mesh barrier may be unfastened to the cross members 104, or may fastened to the cross members 104 by fasteners 300.

The bolt 400 could be a cup square headed bolt version using a snap off shear
20 nut 500 for a mesh fencing assembly. Or, the bolt 400 could be a shear bolt 400 as described above, fastened into a captured thread. Or, the bolt 400 could be a captured hex-headed bolt, fastened into a snap off shear nut 500.

Although embodiments of the present invention have been described in the
25 preceding paragraphs with reference to various examples, it should be appreciated that modifications to the examples given can be made without departing from the scope of the invention as claimed. For example, a shear bolt as described above could be used instead of, or in addition to, a shear nut 500.

30 Features described in the preceding description may be used in combinations other than the combinations explicitly described.

Although functions have been described with reference to certain features, those functions may be performable by other features whether described or not.

Although features have been described with reference to certain embodiments,
5 those features may also be present in other embodiments whether described or not.

Whilst endeavouring in the foregoing specification to draw attention to those features of the invention believed to be of particular importance it should be
10 understood that the Applicant claims protection in respect of any patentable feature or combination of features hereinbefore referred to and/or shown in the drawings whether or not particular emphasis has been placed thereon.

CLAIMS

1. A security fencing assembly comprising:
 - a pair of spaced ground engaging posts;
 - 5 a plurality of elongate members located between the ground engaging posts to collectively provide a barrier; and
 - a plurality of fasteners to secure the barrier between the ground engaging posts,
 - wherein each fastener comprises a threaded shaft engageable with a
 - 10 respective mating threaded component, and
 - wherein the threaded shaft comprises a metal portion and a polymer patch portion both located to be in simultaneous threaded contact with the mating threaded component.
- 15 2. The security fencing assembly of claim 1, wherein the metal portion of the threaded shaft comprises stainless steel, titanium, or aluminium, such that the metal portion of the threaded shaft is friction-welded to the mating threaded component, and wherein the polymer patch portion assists with the friction-welding by increasing a normal force therebetween to increase a galling effect.
- 20 3. The security fencing assembly of claim 1 or 2, wherein the metal portion comprises an austenitic class of stainless steel, and/or wherein each fastener is formed from substantially the same alloy grade of metal as the respective mating threaded component.
- 25 4. The security fencing assembly of claim 1, 2, or 3, wherein the mating threaded component is in the form of a shear nut comprising a nut portion breakably coupled to an anti-tamper portion.
- 30 5. The security fencing assembly of claim 4, wherein each fastener is dimensioned such that when the nut portion of the shear nut breaks off from the

anti-tamper portion, the anti-tamper portion is in simultaneous threaded contact with the polymer patch portion and the metal portion of the threaded shaft.

6. The security fencing assembly of claim 4 or 5, wherein the nut portion of the shear nut comprises a tool-receiving portion.

7. The security fencing assembly of claim 4, 5, or 6, wherein the anti-tamper portion of the shear nut has a tool-resistant shape, resistant to being engaged by a fastener-loosening tool.

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8. The security fencing assembly of any one of claims 4 to 7, wherein the shear nut has a nominal breaking torque in the order of magnitude of tens of Newton-metres.

9. The security fencing assembly of any preceding claim, wherein the elongate members are elongate pale members located between the ground engaging posts and extending upwardly to collectively provide the barrier, wherein the security fencing assembly comprises a cross member extending between the pair of spaced ground engaging posts, wherein the fasteners each fasten one of the elongate pale members to the cross member, and wherein each of the elongate pale members is shaped to define a recess in which the respective fastener is received.

10. The security fencing assembly of claim 9, wherein each fastener further comprises a head connected to the threaded shaft, and wherein the head is received in a corresponding recess of an elongate pale member.

11. The security fencing assembly of claim 10, wherein the head has an elongate aspect ratio when viewed in a plane in which the fastener is rotatable, and wherein the elongate aspect ratio of the head is dimensioned relative to the recess to resist rotation of the head within the recess.

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12. The security fencing assembly of claim 10 or 11, wherein the recess is defined by a pair of sloped side surfaces and a base surface therebetween, wherein the head comprises an underside to which the threaded shaft is connected, the underside of the head comprising sloped underside portions, and wherein when the fasteners are within the recesses, the sloped underside portions of the head are mostly parallel or parallel to the pair of sloped side surfaces of the recess.
13. The security fencing assembly of claim 10, 11, or 12, wherein the head has a tool-resistant shape, resistant to being engaged by a fastener-loosening tool.
14. The security fencing assembly of claim 13, wherein the head has a variable thickness in multiple orthogonal planes, each orthogonal to the plane in which the head is rotatable, to define the tool-resistant shape, and wherein the variable thickness is to conform to a shape of the recess.
15. The security fencing assembly of claim 14, wherein the recess is an elongate recess, wherein the head has a lower surface that is convex when viewed in a first one of the orthogonal planes, extending across the elongate recess.
16. The security fencing assembly of claim 14 or 15, wherein the head has an upper surface that is convex when viewed in the second orthogonal plane extending along the recess.
17. The security fencing assembly of claim 16, wherein the head has a rounded perimeter to prevent a spanner or socket from being engaged with the perimeter, and wherein the upper surface of the head is directly connected to the lower surface of the head by the rounded perimeter, the upper surface being convex shaped.

18. The security fencing assembly of claim 15 and claim 16 or 17, wherein the head defines a saddle shape.

19. The security fencing assembly of any one of claims 9 to 18, wherein each
5 elongate pale member defines an elongate W profile, and wherein the recess is a central recess of the elongate W profile.

20. The security fencing assembly of any one of claims 9 to 19, wherein the
10 fasteners are arranged such that a recessed portion of each fastener is front-facing and a protruding portion of each fastener is rear-facing.

21. The security fencing assembly of claim 20, wherein a cross member to
which the elongate pale members are secured comprises an upright section
and a transverse section extending transverse to the upright section, wherein
15 the upright section comprises holes for the fasteners, and wherein the transverse section protrudes from the upright section by a further distance than the distance by which the protruding portions of the fasteners protrude.

22. The security fencing assembly of any one of claims 9 to 21, wherein the
20 fasteners secure the elongate pale members to a pair of vertically-separated cross members, and wherein the fasteners secure the elongate pale members to the front faces of the pair of cross members.

23. The security fencing assembly of any preceding claim, wherein the
25 polymer patch portion defines a prevailing torque selected from 2Nm to 15Nm.

24. The security fencing assembly of any preceding claim, wherein the polymer patch portion is formed from nylon or polyphthalamide.

30 25. The security fencing assembly of any preceding claim, wherein the polymer patch portion extends around part of each thread of a plurality of threads of the threaded shaft, for example by no more than half a thread turn.