The first noggin/nogging 110 claimed includes three flanges 111, 112, 113, which are joined together but exist in three separate planes and extend along a longitudinal direction, wherein one of the flanges 112 extends further in said longitudinal direction to form tabs 114 for attaching to joists. The second claimed noggin 10 comprises three flanges 11, 12, 13, wherein two of the flanges 11, 13 are not parallel such that they tend towards each other and in use the two flanges exert a gripping action on a substrate received between them. A third claimed noggin (310, Figure 11) is made from two members (320, 330, Figure 11) adapted to telescopically slide relative to each other in order to vary the effective length of the noggin. A fourth claimed noggin (410, Figure 14) comprises two members (420, 430, Figure 14) which are arranged to articulate relative to each other, preferably by rotatably fixing one member to the other, to allow modification of the longitudinal length of the noggin. The cross sections of the said noggins are preferably generally in a square C shape in order to receive a substrate.
FIG. 1
(PRIOR ART)

FIG. 2
(PRIOR ART)
Noggin

The present invention relates to a noggin and, in particular, to a perimeter noggin.

Noggins according to the present invention have particular utility in the construction/installation of floor decks in buildings and other structures.

During the construction of buildings and other structures, a floor deck is typically attached to, built in, or installed on, one or more supporting walls, substructures or other supporting surfaces/members. It is important that loads from floor decks (comprising both horizontal and vertical loads) are properly transferred to the walls, substructures or other supporting surfaces/members on which they are mounted or supported. It is also preferable that the floor decks are mounted or supported in a substantially level orientation and provide a substantially flat surface on which the floor surface can be received. It is also preferred that subsequent loading of the floor and floor deck, e.g. by placement of furniture, does not cause substantial bowing of the floor or floor deck.

Where floor joists (typically solid timber, I-joists or metal web joists) are supported from masonry, timber or other structures – either built in or supported by one or more joist hangers – there is a requirement for the perimeter edge or edges of the floor decking (typically timber or a wood composite such as chip board or orientated strand board (OSB)) spanning one or more joists to be supported where it bridges from joist to joist.
Traditionally, this support has been provided by a noggin 1 (see Figures 1 and 2), also referred to as a "perimeter" noggin 1, in the form of a solid timber or I joist member, skew nailed or fixed via proprietary connectors 2, to the inside faces of the floor joists 5 and finishing flush with the top of the floor joists 5. The noggin 1 can be fitted against, or set back from, the face of the supporting masonry, timber or other structure.

Noggins and perimeter noggin installations according to the prior art suffer from the problems that:

i) each noggin must be cut to an appropriate length (which may be bespoke);

ii) either skew nailing of each end of each noggin must be performed (multiple nails being required and the resultant connection being liable to splitting or imperfect installation), or a z-clip or other proprietary connector must be nailed, typically twice at each of two locations of each end of each noggin;

iii) the noggin must then be "dropped" into the gap between joists where it is to be received; and

iv) the noggin and z-clips/proprietary connectors must again be nailed, typically twice per z-clip or other proprietary connector, into the top of adjacent joists between which they are supported.
This approach requires precise measuring of each gap between joists prior to installation, each gap being different due to tolerances in construction/installation.

Each noggin must then be cut to a specific bespoke length to provide for a flush tight fit (taking into account the width dimensions of the z-clips or other proprietary connectors used.

Each noggin must fit flush height-wise to provide the necessary support for the floor deck to be received.

All of the above must be done in situ on a case by case basis by a trained tradesperson, such as a carpenter, so as to provide the necessary tightly fitted bespoke perimeter noggins, or the resulting support can be compromised.

The present invention addresses these problems.

In a first aspect, the present invention provides a noggin comprising:

an elongate first side flange extending in a longitudinal axis in a first plane;

an elongate top flange extending in a longitudinal axis in a second plane; and

an elongate second side flange extending in the longitudinal axis in a third plane, wherein:

the first, second and third planes are not coincident; and

the elongate top flange extends further in the longitudinal direction than the elongate first and second side flanges so as to form first and second top flange tabs.
Further aspects of the present invention are as set out in the appended claims.

Preferred embodiments of the present invention will now be described by way of example only with reference to the accompanying drawings, in which:

Figure 1 is a schematic illustration of a prior art perimeter noggin installation formed using prior art noggins and z-clips;

Figure 2 is a schematic perspective view of the prior art z-clip of Figure 1;

Figure 3 is a schematic perspective view of a noggin according to a first preferred embodiment of the present invention;

Figure 4 is a schematic illustration of a perimeter noggin installation formed using the noggin of Figure 3;

Figures 5a to 5e are schematic illustrations of possible cross section of the noggin of Figure 3;

Figure 6 is a schematic perspective view of a noggin according to a further preferred embodiment of the present invention;

Figure 7 is a schematic illustration of a perimeter noggin installation formed using the noggin of Figure 6;

Figure 8 is a schematic illustration of an alternative perimeter noggin installation formed using the noggin of Figure 6;

Figures 9a to 9c are schematic illustrations of possible cross section of the noggin of Figure 6;

Figure 10 is a schematic perspective view of a noggin according to a further preferred embodiment of the present invention;
Figure 11 is a schematic perspective view of a noggin according to a yet further preferred embodiment of the present invention;

Figures 12a to 12c are schematic illustrations of possible end face connecting means of the noggins of Figures 10 and 11;

Figure 13 is a schematic illustration of a perimeter noggin installation formed using the noggin of Figure 11 with end face connecting means of Figure 12a;

Figure 14 is a schematic illustration of a perimeter noggin installation formed using a noggin according to a further preferred embodiment of the present invention; and

Figures 15a to 15c are schematic illustrations of possible cross section of parts of the noggin of Figure 14.

Referring first to Figures 3 and 4, there is illustrated a noggin 10 according to a first preferred embodiment. The noggin 10 is an elongate channel member, comprising first and second elongate side flanges 11, 13 held in a joined spaced apart configuration by an end flange 12. The first and second side flanges 11, 13 and the end flange 12 are all of substantially planar form, and all extend longitudinally in the z-axis direction illustrated (which can adopt any orientation in use). The end flange 12 is arranged substantially perpendicular to the first side flange 11, but not so substantially perpendicular to the second side flange 13 (angled approximately 69 to 89 degrees). As a result, the first and second side flanges 11, 13 are arranged not quite parallel to one another, but instead arranged so that the second side flange 13 is biased towards the first side flange 11 at the "open" end so as to grip the floor deck substrate 20 received in use (the
respective planes of the first side flange 11 and second side flange 13 being angled relative to one another by, typically, some 1 to 21 degrees). The joins between the respective first and second side flanges 11, 13 and the end flange 12 are also elongate and can be formed by bending from sheet material or joining parts together.

In use, the noggin 10 clips over and reinforces the unsupported edge of the floor deck substrate 20. Typically, the floor deck substrate 20 is of the order of 18 to 22mm in thickness. The noggin may be provided as a continuous elongate member to reinforce the entire edge of the floor deck substrate 20, or may be cut or provided in discrete lengths to bridge only the unsupported edge of the floor deck substrate 20 between joists 5. The noggin 10 can be applied to the floor deck substrate 20 before, during or after installation of the floor deck substrate 20 upon joists 5. Optionally, the noggin 10 can be mechanically (e.g. by fasteners) or chemically (e.g. by adhesive) affixed to the floor deck substrate 20 and/or joists 5. Accordingly, optional fastener apertures (not shown) and/or textured/featured surfaces may be provided. Once installed, the noggin 10 provides support to the edges of the floor deck substrate 20 and is sufficiently flush with the floor deck substrate 20 on its upper and lower installed surfaces so as not to interfere with the joists 5 or floor finish to be received on the floor deck substrate 20.

It will be appreciated that various profiles of noggin 10 are possible, and example cross sections are illustrated in Figures 5a to 5e.
In Figure 5a, a simple "l" section is adopted, with elongate first side and end flanges 11, 12 arranged substantially perpendicular to one another. In use, the resulting noggin 10 will be mechanically (e.g. by fasteners) or chemically (e.g. by adhesive) affixed to the floor deck substrate 20 and/or joists 5.

In Figure 5b, a classic "c" section is adopted, with elongate first side and end flanges 11, 12 arranged substantially perpendicular to one another, and elongate second side flange 13 arranged substantially perpendicular to end flange 12 and substantially parallel to first side flanges 11. In use, the resulting noggin 10 can be mechanically (e.g. by fasteners) or chemically (e.g. by adhesive) affixed to the floor deck substrate 20 and/or joists 5.

In Figure 5c, an alternative "c" section is adopted, with elongate first side and end flanges 11, 12 arranged substantially perpendicular to one another. An elongate second side flange 13 is provided, and this comprises first and second potions 13a, 13b each arranged not quite perpendicular to end flange 12 and not quite parallel to first side flanges 11. First portion 13a is biased towards the first side flange 11 at the "open" end so as to grip the floor deck substrate 20 received in use (the respective planes of the first side flange 11 and first portion 13a of second side flange 13 being angled relative to one another by, typically, some 1 to 21 degrees). Second portion 13b is biased away from the first side flange 11 at the "open" end so as to offer an ease of insertion feature for the floor deck substrate 20 to be received in use (the respective planes of the first side flange 11 and second portion 13b of second side flange 13 being angled relative to one another
by, typically, some 1 to 21 degrees). In use, the resulting noggin 10 can be mechanically (e.g. by fasteners) or chemically (e.g. by adhesive) affixed to the floor deck substrate 20 and/or joists 5.

In Figure 5d, a yet further alternative "c" section is adopted, with elongate first side and end flanges 11, 12 and elongate second side flange 13. The elongate end flange 12 comprises first and second potions 12a, 12b, with first portion 12a arranged not quite perpendicular to first side flange 11 or second side flange 13. The second portion 12b is arranged substantially perpendicular to first side flange 11, but not quite perpendicular to second side flange 13. The elongate second side flange 13 comprises first and second potions 13a, 13b. First portion 13a is biased towards the first side flange 11 at the "open" end so as to grip the floor deck substrate 20 received in use (the respective planes of the first side flange 11 and first portion 13a of second side flange 13 being angled relative to one another by, typically, some 1 to 21 degrees). Second portion 13b is biased away from the first side flange 11 at the "open" end so as to offer an ease of insertion feature for the floor deck substrate 20 to be received in use (the respective planes of the first side flange 11 and second portion 13b of second side flange 13 being angled relative to one another by, typically, some 1 to 21 degrees). In use, the resulting noggin 10 can be mechanically (e.g. by fasteners) or chemically (e.g. by adhesive) affixed to the floor deck substrate 20 and/or joists 5.

In Figure 5e, a somewhat "z" section is adopted, with elongate first side and end flanges 11, 12 arranged substantially perpendicular to one another. An elongate second side flange 13 is provided, arranged not quite
perpendicular to end flange 12 and not quite parallel to first side flanges 11. The second side flange 13 is biased towards the first side flange 11 at the "open" end so as to grip the floor deck substrate 20 received in use (the respective planes of the first side flange 11 and first portion 13a of second side flange 13 being angled relative to one another by, typically, some 1 to 21 degrees). An elongate downstand flange 14 is additionally provided, arranged substantially perpendicular to first side flange 11 and substantially parallel to end side flange 12. Downstand flange 14 provides additional rigidity to noggin 10 so as to cater for applications where increased or unusually high loading is expected. In use, the resulting noggin 10 can be mechanically (e.g. by fasteners) or chemically (e.g. by adhesive) affixed to the floor deck substrate 20 and/or joists 5.

The various profiles illustrated in Figures 5a to 5e can either be run over the top of, or fit between, the supporting joists 5, depending on the profile type selected and its length. As such, profile lengths will typically be in the range of 0.4m to 1.2m, although any suitable length may be beneficially employed. Where selected profiles are to fit between supporting joists 5, the profiles may be cut and/or supplied in discrete lengths based on the joist widths and joist centres (e.g. 0.4m, 0.45m or 0.6m). The thickness of the sheet material employed to form the various profiles will typically be in the range of 0.9mm to 2.0mm, although any suitable thickness may be beneficially employed. Typical dimensions of the profiles illustrated in Figures 5a to 5d are as follows (where reference to the term
width means the width or depth of the element rather than the elongate length in the longitudinal direction):

i) first side flange 11 - substantially 25mm width;
ii) end flange 12 - substantially 23mm width;

iii) second side flange 13 - substantially 15 to 25mm width;

iv) second side flange first portion 13a - substantially 5 to 25mm width;

v) second side flange second portion 13b - substantially 5 to 25mm width.

Typical dimensions of the profile illustrated in Figure 5e are as follows:

i) first side flange 11 - substantially 50 to 100 mm width;

ii) end flange 12 - substantially 23mm width;

iii) second side flange 13 - substantially 10 to 15mm width;

iv) downstand flange 14 - substantially 10 to 25mm width.

Referring next to Figures 6, 7 and 8, there is illustrated a noggin 110 according to a further preferred embodiment. The noggin 110 is an elongate channel member, comprising first and second elongate side flanges 111, 113 held in a joined spaced apart configuration by a top flange 112. The first and second side flanges 111, 113 and the top flange 112 are all of substantially planar form, and all extend longitudinally in the x-axis direction illustrated (which can adopt any orientation in use). The top flange 112 is arranged substantially perpendicular to the first and second side flanges 111, 113, and is provided additionally with tabs 114, 115 extending at respective proximal and
distal ends. These tabs 114, 115 are positioned offset with respect to one another and locate the noggin 110 in place in use, as shown in Figures 7 and 8, each tab 114, 115 being received respectively on a top surface of adjacent joists 5, side by side if necessary. Optionally, each tab 114, 115 comprises one or more apertures 118 for receiving a nail or other fastener to affix the noggin 110 to the joist 5. Optionally, as illustrated, the substantially parallel first and second side flanges 111, 113 are arranged so to be spaced out of phase with respect to one another rather than being coextensive. This provides for skewed installation as illustrated in Figure 8. The joins between the respective first and second side flanges 111, 113 and the top flange 112 are also elongate and can be formed by bending from sheet material or joining parts together. Optional embossments 116 may be provided as required to add rigidity to the noggin 110.

In use, the noggin 110 is first lowered into the gap between joists 5 between which it is to be received. The tabs 114, 115 prevent the noggin 110 from dropping through below the joists 5. The noggin 110 is next positioned either perpendicularly to the joists 5, as illustrated in Figure 7, or skewed, as illustrated in Figure 8. Typically, this will depend upon noggin length, joist widths and joist centres. Preferably, the first and second side flanges 111, 113 are offered up to and touch the respective sides of joists 5. Optionally, the noggin 110 can be mechanically (e.g. by fasteners) or chemically (e.g. by adhesive) affixed via tabs 114, 115 to the top surface of the supporting joists 5. The noggin 110 can be applied to the joists 5 before, during or after installation of the floor deck.
substrate 20 upon joists 5. Accordingly, optional textured/featured surfaces may be provided on the noggin 110 where adhesive is used rather than mechanical fasteners. Once installed, the noggin 110 provides support to the floor deck substrate 20 and is sufficiently flush with the top surfaces of the joists 5 so as not to interfere with the floor deck substrate 20.

It will be appreciated that various profiles of noggin 110 are possible, and example cross sections are illustrated in Figures 9a to 9c.

In Figure 9a, a simple "I" section is adopted, with elongate first side and top flanges 111, 112 arranged substantially perpendicular to one another.

In Figure 9b, a classic "C" section is adopted, with elongate first side and top flanges 111, 112 arranged substantially perpendicular to one another, and elongate second side flange 113 arranged substantially perpendicular to top flange 112 and substantially parallel to first side flanges 111.

In Figure 9c, an alternative "C" section is adopted, similar to the Figure 9b embodiment, but additionally provided with first and second bottom flange potions 117a, 117b each arranged substantially perpendicular to first and second side flanges 111, 113, and substantially parallel to top flange 112. First and second bottom flange potions 117a, 117b provide additional rigidity to the noggin 110.

The selected profiles are to fit between supporting joists 5, and so the profiles may be cut and/or supplied in discrete lengths based on the joist widths and joist centres (e.g. 0.4m, 0.45m or 0.6m). As such, the overall length of
the top flange including tabs (each typically of 0.02m to 0.03m in length) will be of the order of 0.42m, 0.47m and 0.62m respectively for 0.4m, 0.45m or 0.6m joist centre fits. The thickness of the sheet material employed to form the various profiles will typically be in the range of 0.9mm to 2.0mm, although any suitable thickness may be beneficially employed. Typical dimensions of the profiles illustrated in Figures 9a to 9c are as follows (where reference to the term width means the width or depth of the element rather than the elongate length in the longitudinal direction):

i) first side flange 111 - substantially 25mm width;
ii) top flange 112 - substantially 20mm width;
iii) second side flange 113 - substantially 25mm width;
iv) first bottom flange portion 117a - substantially 5 to 10mm width;
v) second bottom flange portion 117b - substantially 5 to 10mm width.

Referring next to Figures 10, 11, 12a to 12c and 13, there are illustrated two further preferred embodiments of noggin 210, 310 according to the present invention.

In Figure 10, the noggin 210 can be seen to comprise first and second elongate channel members 220, 230 received telescopically one within the other, and slidable relative to one another so as to vary the effective length of the noggin 210. The first elongate channel member 220 comprises first and second elongate side flanges 221, 223 held in a joined spaced apart configuration by a top flange 222. The first and second side flanges 221, 223 and the top flange 222 are all of substantially planar form, and all extend
longitudinally in the x-axis direction illustrated (which can adopt any orientation in use). The top flange 222 is arranged substantially perpendicular to the first and second side flanges 221, 223. The first elongate channel member 220 is additionally provided with first and second bottom flange potions 227a, 227b each arranged substantially perpendicular to first and second side flanges 221, 223, and substantially parallel to top flange 222. First and second bottom flange potions 227a, 227b provide additional rigidity to the first elongate channel member 220. First and second side flanges 221, 223 are each additionally provided at a first proximal end with respective flanges 224, 225 extending perpendicularly thereto in the y-z plane. These flanges 224, 225 are provided to locate the noggin 210 in place in use, as shown in Figures 13, each flange 224, 225 being received respectively on a side surface of a joist 5. Optionally, each flange 224, 225 comprises one or more apertures 228 for receiving a nail or other fastener to affix the noggin 210 to the joist 5. Similarly, the second elongate channel member 230 comprises first and second elongate side flanges 231, 233 held in a joined spaced apart configuration by a top flange 232. The first and second side flanges 231, 233 and the top flange 232 are all of substantially planar form, and all extend longitudinally in the x-axis direction illustrated (which can adopt any orientation in use). The top flange 232 is arranged substantially perpendicular to the first and second side flanges 231, 233. The second elongate channel member 230 is additionally provided with first and second bottom flange potions 237a, 237b each arranged substantially perpendicular to first and second side flanges 231, 233, and substantially parallel to top flange 232. First and second bottom flange
potions 237a, 237b provide additional rigidity to the second elongate channel member 230. First and second side flanges 231, 233 are each additionally provided at a second distal end with respective flanges 234, 235 extending perpendicularly thereto in the y-z plane. These flanges 234, 235 are provided to locate the noggin 210 in place in use, as shown in Figures 13, each flange 234, 235 being received respectively on a side surface of a joist 5. Optionally, each flange 234, 235 comprises one or more apertures 238 for receiving a nail or other fastener to affix the noggin 210 to the joist 5. In the embodiment shown, the first elongate channel member 220 is received within the second elongate channel member 230 and can be slid telescopically relative thereto so as to vary the effective length of the noggin 210. A locking means (not shown) may optionally be provided to releasably lock the first elongate channel member 220 to the second elongate channel member 230 once the desired length of the noggin 210 has been set. The locking means may take any suitable form, such as a clamping device, ratchet system or series of apertures on respective slidable parts (e.g. flanges) which can be pinned to prevent relative movement.

Optionally (not illustrated) the various first and second side flanges of the noggin 210 can be arranged so to be spaced out of phase with respect to one another rather than being coextensive. This provides for skewed installation as has been described above and illustrated in respect of the noggin 110 shown in Figure 8. The joins between the respective first and second side flanges and the top flange are also elongate and can be formed by bending from sheet material or joining parts together. Optional
embossments may also be provided as required to add rigidity to the noggin 210.

In use, the noggin 210 is first offered into the gap between joists 5 between which it is to be received. First and second elongate channel members 220, 230 are slid telescopically relative to one another so as to vary the effective length of the noggin 210. The optional locking means may be used to lock the noggin 210 to prevent further telescoping of the respective parts. Flanges 224, 225, 234, 235 are used to locate the noggin 210 in place in use, as shown in Figures 13, each flange 224, 225, 234, 235 being received respectively on a side surface of a joist 5. Optional apertures 228, 238 can be used to receive a nail or other fastener to affix the noggin 210 to the joist 5. Adhesive may be used in the alternative or additionally, as may the feature of a simple mechanical interference fit by locking of the locking means when the noggin 210 is marginally oversized in the longitudinal direction. The noggin 210 can be applied to the joists 5 before, during or after installation of the floor deck substrate 20 upon joists 5. Accordingly, optional textured/featured surfaces may be provided on the noggin 210 where adhesive is used rather than mechanical fasteners. Once installed, the noggin 210 provides support to the floor deck substrate 20 and is sufficiently flush with the top surfaces of the joists 5 so as not to interfere with the floor deck substrate 20.

In Figure 11, the noggin 310 can be seen to comprise first, second and third elongate channel members 320, 330, 340, the first and second elongate channel members 320, 330
being received telescopically within the third elongate channel member 340 and all being slidable relative to one another so as to vary the effective length of the noggin 310. The first and third elongate channel members 320, 330 comprises first and second elongate side flanges 321, 323, 331, 333 held in a joined spaced apart configuration by a top flange 322, 332. The first and second side flanges 321, 323, 331, 333 and the top flange 322, 332 are all of substantially planar form, and all extend longitudinally in the x-axis direction illustrated (which can adopt any orientation in use). The top flange 322, 332 is arranged substantially perpendicular to the first and second side flanges 321, 323, 331, 333. The first and second elongate channel members 320, 330 are both additionally provided with first and second bottom flange potions 327a, 327b, 337a, 337b each arranged substantially perpendicular to first and second side flanges 321, 323, 331, 333 and substantially parallel to top flange 322, 332. First and second bottom flange potions 327a, 327b, 337a, 337b provide additional rigidity to the first and second elongate channel members 320, 330. Top flange 322, 332 is provided additionally with tab 324, 335 extending at a proximal end in the case of the first elongate channel member 320 and a distal end in the case of the second elongate channel member 330. These tabs 324, 335 locate the noggin 310 in place in use, each tab 324, 335 being received respectively on a top surface of adjacent joists 5. Optionally, each tab 324, 335 comprises one or more apertures 328, 338 for receiving a nail or other fastener to affix the noggin 310 to the joist 5. Similarly, the third elongate channel member 340 comprises first and second elongate side flanges 341, 343 held in a joined spaced apart configuration by a top flange 342. The first
and second side flanges 341, 343 and the top flange 342 are all of substantially planar form, and all extend longitudinally in the x-axis direction illustrated (which can adopt any orientation in use). The top flange 342 is arranged substantially perpendicular to the first and second side flanges 341, 343. The third elongate channel member 340 is additionally provided with first and second bottom flange portions 347a, 347b each arranged substantially perpendicular to first and second side flanges 341, 343, and substantially parallel to top flange 342. First and second bottom flange portions 347a, 347b provide additional rigidity to the third elongate channel member 340. In the embodiment shown, the first and second elongate channel members 320, 330 are received within the third elongate channel member 340 and can be slid telescopically relative thereto so as to vary the effective length of the noggin 310. Locking means (not shown) may optionally be provided to releasably lock the first, second and third elongate channel members 320, 330, 340 relative to one another once the desired length of the noggin 310 has been set. The locking means may take any suitable form, such as a clamping device, ratchet system or series of apertures on respective slidable parts (e.g. flanges) which can be pinned to prevent relative movement.

The joins between the respective first and second side flanges and the top flange are also elongate and can be formed by bending from sheet material or joining parts together. Optional embossments may also be provided as required to add rigidity to the noggin 310.

In use, the noggin 310 is first offered into the gap between joists 5 between which it is to be received. First,
second and third elongate channel members 320, 330, 340 are slid telescopically relative to one another so as to vary the effective length of the noggin 310. The optional locking means may be used to lock the noggin 310 to prevent further telescoping of the respective parts. The tabs 324, 335 prevent the noggin 310 from dropping through below the joists 5. The noggin 310 is next positioned substantially perpendicularly to the joists 5, as has been described above and illustrated in Figure 7. Typically, the effective length will depend upon noggin length, joist widths and joist centres. Preferably, the first and second side flanges 321, 323, 331, 333 are offered up to and touch the respective sides of joists 5. Optionally, the noggin 310 can be mechanically (e.g. by fasteners) or chemically (e.g. by adhesive) affixed via tabs 324, 335 to the top surface of the supporting joists 5. The noggin 310 can be applied to the joists 5 before, during or after installation of the floor deck substrate 20 upon joists 5. Accordingly, optional textured/featured surfaces may be provided on the noggin 310 where adhesive is used rather than mechanical fasteners. Once installed, the noggin 310 provides support to the floor deck substrate 20 and is sufficiently flush with the top surfaces of the joists 5 so as not to interfere with the floor deck substrate 20.

It will be appreciated that various end connections are possible, and examples of such cross sections are illustrated in detail in Figures 12a to 12c.

Figure 12a illustrates the end connection detail of the noggin 210 of Figure 10.

Figure 12b illustrates the end connection detail of the noggin 310 of Figure 11.
In Figure 12c, an alternative version of Figure 12a is illustrated, comprising just one flange.

The selected telescoping profiles are to fit between supporting joists 5, and so the profiles may be cut and/or supplied in discrete lengths based on the joist widths and joist centres (e.g. 0.4m, 0.45m or 0.6m) to be accommodated. As such, each may expand and close from substantially 0.35m and 0.6m respectively. The thickness of the sheet material employed to form the various profiles will typically be in the range of 0.9mm to 2.0mm, although any suitable thickness may be beneficially employed. Typical dimensions of the profiles illustrated are substantially as has been described above for the earlier embodiments, bearing in mind the need for telescoping of the respective parts.

Referring next to Figures 14 and 15a to 15c there is illustrated a further preferred embodiment of noggin 410 according to the present invention. The noggin 410 is formed from two articulated elongate hybrid channel/flange members 420, 430, each comprising first and second elongate side flange portions 421, 423, 431, 433 held in a joined spaced apart configuration by a top flange 422, 432 and provided in pairs spaced apart longitudinally. The first and second side flange portions 421, 423, 431, 433 and the top flange 422, 432 are all of substantially planar form, the top flange 422, 432 extending longitudinally in the general x-axis direction illustrated (which can adopt any orientation in use), and the first and second side flange portions 421, 423, 431, 433 extending in paired portions in the general longitudinal x-axis direction illustrated (which can adopt any orientation in use). The top flange 422, 432
is arranged substantially perpendicular to the first and second side flange portions 421, 423, 431, 433, and is provided additionally with tabs 424, 425 extending at respective proximal and distal ends. These tabs 424, 425 locate the noggin 410 in place in use, as shown in Figure 14, each tab 424, 425 being received respectively on a top surface of adjacent joists 5. Optionally, each tab 424, 425 comprises one or more apertures 428 for receiving a nail or other fastener to affix the noggin 410 to the joist 5.

Optionally, as illustrated, the substantially parallel first and second side flange portions 421, 423, 431, 433 are arranged so to be spaced out of phase with respect to one another rather than being coextensive. This provides for skewed installation as has been described above and illustrated in Figure 8, and is relevant here for the articulation shown. The joins between the respective first and second side flange portions 421, 423, 431, 433 and the top flange 422, 432 are also elongate and can be formed by bending from sheet material or joining parts together.

Optional embossments 426 may be provided as required to add rigidity to the noggin 410. The two articulated elongate hybrid channel/flange members 420, 430 are rotatably affixed to one another by any suitable means, such as a rivet, and this provides for width adjustment of the noggin 410 to accommodate various joist widths and joist centres.

In use, the noggin 410 is first lowered into the gap between joists 5 between which it is to be received. The two articulated elongate hybrid channel/flange members 420, 430 of noggin 410 are articulated, as illustrated in Figure 14, so that the tabs 424, 425 prevent the noggin 410 from dropping through below the joists 5. Typically, this will
depend upon noggin length, joist widths and joist centres. Preferably, the first and second side flange portions 421, 423, 431, 433 are offered up to and touch the respective sides of joists 5. Optionally, the noggin 410 can be mechanically (e.g. by fasteners) or chemically (e.g. by adhesive) affixed via tabs 424, 425 to the top surface of the supporting joists 5. The noggin 410 can be applied to the joists 5 before, during or after installation of the floor deck substrate 20 upon joists 5. Accordingly, optional textured/featured surfaces may be provided on the noggin 410 where adhesive is used rather than mechanical fasteners. Once installed, the noggin 410 provides support to the floor deck substrate 20 and is sufficiently flush with the top surfaces of the joists 5 so as not to interfere with the floor deck substrate 20.

It will be appreciated that various profiles of noggin 410 are possible, and example cross sections are illustrated in Figures 15a to 15c.

In Figure 15a, a simple "l" section is adopted, with elongate first side and top flanges 421, 422 arranged substantially perpendicular to one another.

In Figure 15b, a classic "c" section is adopted, with elongate first side and top flanges 421, 422 arranged substantially perpendicular to one another, and elongate second side flange 423 arranged substantially perpendicular to top flange 422 and substantially parallel to first side flanges 421.

In Figure 15c, an alternative "c" section is adopted, similar to the Figure 15b embodiment, but additionally provided with first and second bottom flange potions 427a, 427b each arranged substantially perpendicular to first and
second side flanges 421, 423, and substantially parallel to top flange 422. First and second bottom flange portions 427a, 427b provide additional rigidity to the noggin 410.

The selected articulating profiles are to fit between supporting joists 5, and so the profiles may be cut and/or supplied in discrete lengths based on the joist widths and joist centres (e.g. 0.4m, 0.45m or 0.6m) to be accommodated. As such, each may articulate to as to span a distance between joists of from substantially 0.35m and 0.6m respectively. The thickness of the sheet material employed to form the various profiles will typically be in the range of 0.9mm to 2.0mm, although any suitable thickness may be beneficially employed. Typical dimensions of the profiles illustrated are substantially as has been described above for the earlier embodiments, bearing in mind the need for articulation of the respective parts.

As has been discussed above, the tabs of certain embodiments of noggin according to the present invention may be offset from a centre line of the flange in question so as to fit adjacent and/or alongside a respective of another noggin in an installation (as illustrated in Figure 7).

In addition, embossments may be provided at any suitable location to strengthen a part or parts of a noggin according to the present invention.

Typically, the sheet material used to form/manufacture noffins according to the present invention will be 0.9 to 2.0mm galvanised mild steel with typical galvanise from Z100 to Z600. Alternatively, any ferrous or non ferrous steel
may be used. Other metals or materials (e.g. composites) or engineering polymers (e.g. plastics) may be used.

Each feature disclosed in this specification (including the accompanying claims, abstract and drawings), may be replaced by alternative features serving the same, equivalent or similar purpose, unless expressly stated otherwise. Thus, unless expressly stated otherwise, each feature disclosed is one example only of a generic series of equivalent or similar features. In addition, all of the features disclosed in this specification (including the accompanying claims, abstract and drawings), and/or all of the steps of any method or process so disclosed, may be combined in any combination, except combinations where at least some of such features and/or steps are mutually exclusive. Accordingly, while many different embodiments of the present invention have been described above, any one or more or all of the features described, illustrated and/or claimed in the appended claims may be used in isolation or in various combinations in any embodiment. As such, any one or more feature may be removed, substituted and/or added to any of the feature combinations described, illustrated and/or claimed. For the avoidance of doubt, any one or more of the features of any embodiment may be combined and/or used separately in a different embodiment with any other feature or features from any of the embodiments.

Whilst preferred embodiments of the present invention have been described above and illustrated in the drawings, these are by way of example only and non-limiting. It will be appreciated by those skilled in the art that many
alternatives are possible within the ambit of the invention. For example, the noggin and installation may take many different forms. As such, the true scope of the invention is that as set out in the appended claims.
CLAIMS

1. A noggin comprising:
   an elongate first side flange extending in a longitudinal axis in a first plane;
   an elongate top flange extending in a longitudinal axis in a second plane; and
   an elongate second side flange extending in the longitudinal axis in a third plane, wherein:
   the first, second and third planes are not coincident;
   and
   the elongate top flange extends further in the longitudinal direction than the elongate first and second side flanges so as to form first and second top flange tabs.

2. A noggin according to claim 1 wherein the elongate second side flange is spaced out of phase with respect to the first side flange so as not be coextensive.

3. A noggin according to any one of the preceding claims wherein the respective first and second planes are substantially perpendicular.

4. A noggin according to claims 1 or 2 wherein the respective first and second planes are not perpendicular.

5. A noggin according to any one of the preceding claims wherein the elongate first, top and second side flanges are of solid sheet material.

6. A noggin according to any one of the preceding claims wherein the elongate first, top and second side flanges are
of solid sheet material having a thickness in the range 0.9mm to 2.0mm.

7. A noggin according to any one of the preceding claims wherein the elongate first, end and second side flanges are of solid sheet material having a thickness of substantially 1.5mm.

8. A noggin according to any one of the preceding claims having a length of substantially 0.4m, 0.45m or 0.6m.

9. A noggin according to any one of the preceding claims wherein the elongate first, top and/or second side flanges are provided with dimples or other surface finish features or treatments for improved keying of adhesives.

10. A noggin according to any one of the preceding claims wherein the top flange tabs comprise fastener apertures for receiving fasteners, and/or keying apertures and/or dimples or other surface finish features or treatments for improved keying of adhesives.

11. A noggin according to any one of the preceding claims wherein the elongate first, top and second side flanges are arranged so as to form at least an approximate c shape in cross-section.

12. A noggin comprising:
    an elongate first side flange extending in a longitudinal axis in a first plane;
    an elongate end flange extending in a longitudinal axis in a second plane; and
an elongate second side flange extending in the longitudinal axis in a third plane, wherein:

the first, second and third planes are not coincident;
and

the elongate first side flange is arranged relative to the elongate second side flange such that the first and second planes are non-parallel and at least portions of the first and second side flanges tend towards each other such that, in use, they exert a gripping action on a substrate received therebetween.

13. A noggin according to claim 12 wherein the first and second planes have at least one common axis are angled relative to one another about the at least one common axis by an angle in the range 69 to 89 degrees.

14. A noggin according to claim 12 or claim 13 wherein the first and second planes have at least one common axis are angled relative to one another about the at least one common axis by an angle in the range 79 to 89 degrees.

15. A noggin according to any one of claims 12 to 14 wherein the first and second side flanges additionally comprise gripping means to exert an improved gripping action on a substrate received therebetween.

16. A noggin according to any one of claims 12 to 15 wherein the elongate first, top and second side flanges are arranged so as to form at least an approximate C shape in cross-section.
17. A noggin according to claims 16 wherein the approximate C shape cross-section has an open end for receiving an edge of a substrate.

18. A noggin comprising:
   an elongate first member extending in a longitudinal axis having a first proximal end and a first distal end;
   an elongate second member extending in the longitudinal axis having a second proximal end and a second distal end,
wherein:
   the elongate first member and elongate second member are telescopically arranged so as to slide relative to one another to vary the effective length of the noggin; and
   the first proximal end and second distal end are provided with joist engaging means.

19. A noggin comprising:
   an elongate first member extending in a longitudinal axis having a first proximal end and a first distal end;
   an elongate second member extending in the longitudinal axis having a second proximal end and a second distal end,
wherein:
   the elongate first member and elongate second member are arranged so as articulate relative to one another to vary the effective length of the noggin; and
   the first proximal ends and second distal ends are provided with joist engaging means.

20. A method of manufacturing a noggin according to any one of the preceding claims, the method comprising the steps of:
   cutting a blank of the noggin from sheet material; and
   forming the blank into the noggin.
21. A method of manufacturing a noggin according to claim 20 wherein the sheet material is a metal sheet material.

22. A method of manufacturing a noggin according to claim 20 wherein the sheet material is a plastics material.

23. Use of a noggin according to any one of claims 1 to 19 in the construction of a floor deck.

24. A floor deck formed using the noggin according to any one of claims 1 to 19.

25. A noggin substantially as hereinbefore described with reference to or as shown in the accompanying drawings.

26. A method of manufacturing a noggin substantially as hereinbefore described with reference to or as shown in the accompanying drawings.

27. Use of a noggin substantially as hereinbefore described with reference to or as shown in the accompanying drawings.

28. A floor deck formed using the noggin substantially as hereinbefore described with reference to or as shown in the accompanying drawings.
Patents Act 1977: Search Report under Section 17

Documents considered to be relevant:

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<th>Category</th>
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<tr>
<td>X</td>
<td>1, 3, 5-11, 20-22</td>
<td>EP1213399 A2 (SIMPSON STRONG TIE) - See Figure 1 and related description.</td>
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<td>US2009/0151294 A1 (STALEY) - See Figure 4 and related description.</td>
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<td>US7213377 B1 (SACKETT) - See Figure 7 and related description</td>
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<td>US3152671 A (MALLORY) - See Figure 2 and related description</td>
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Worldwide search of patent documents classified in the following areas of the IPC

E04B; E04C

The following online and other databases have been used in the preparation of this search report

WPI and EPODOC
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