Improved Bracket Assembly

FIELD OF THE INVENTION

The present invention relates to an improved bracket assembly. The bracket assembly of the present invention has particular application to connecting a partition wall and / or related components (such as a ceiling grid) to an overhead structural component of a building. However, the invention may also have other applications.

BACKGROUND

Devices for attaching a non-structural component(s) of a building, such as a partition wall(s) and / or ceiling grid(s), to an overhead structural component(s) of the building, are known.

One such device is the bracket assembly disclosed in NZ631234, which comprises a generally V-shaped bracket mounted on a bearing member and a sleeve member. The sleeve member attaches to the non-structural components, while the arms of the bracket are connected via elongate linking members to the overhead structure.

The bracket assembly of NZ631234 provides an effective and user-friendly means for sturdily anchoring the non-structural components, helping to proof these against selected seismic and wind loadings. However, it is not specifically designed to accommodate vertical movement as between the non-structural components and the overhead structure (referred to as “vertical deflection”). In builds where it is necessary to account for vertical deflection, the bracket assembly of NZ631234 must be used in conjunction with extraneous components such as a deflection track. This adds to complexity of design and installation, and therefore also to cost.

Accordingly, it is an object of the present invention to provide a bracket assembly for sturdily and securely connecting non-structural components of a building to the overhead structure while also allowing a measure of vertical deflection. At the very least, it is an object of the present invention to provide the public with a useful choice.

STATEMENTS OF THE INVENTION

According to a first broad aspect of the invention, there is provided a bracket assembly for connecting a non-structural component of a building to an overhead structural component of the building, the bracket assembly comprising:

a shaft configured to, in use, be connectable to the non-structural component; and

a bracket disposed about the shaft and configured to, in use, be connectable to the overhead structural component

wherein the bracket is in a sliding relationship relative to the shaft, wherein the bracket assembly further comprises a first biasing means disposed about the shaft above or below the bracket and configured to, in use, urge the bracket into a neutral position along the shaft, being the position of the bracket in the absence of applied forces acting on the bracket.

Preferably, the non-structural component comprises a partition wall, and reference will be made accordingly throughout the remainder of this specification.

Preferably, the partition wall comprises a head track disposed at an upper end of the partition wall, to which the shaft is connectable in use. Throughout the remainder of the present specification, reference to connecting the shaft to the partition wall will be understood as meaning connecting the shaft to the head track.

Preferably, the overhead structural component (hereinafter "overhead structure") comprises a roof structure of the building, or a floor structure of a storey of the building directly above a space where the temporary structural component is located.

Preferably, the shaft comprises an elongate component.

Preferably, a length of the shaft is between substantially 95mm and 135mm. More preferably, the length of the shaft is substantially 115mm.

Preferably, the shaft has a substantially circular cross-section.

Preferably, the shaft is configured to, in use, be connectable to the partition wall at a first end of the shaft.

Preferably, the bracket assembly comprises an intermediate component(s), such a plinth, configured to, in use, facilitate connection between the first end of the shaft and the partition wall.

Preferably, the shaft comprises a connecting portion at its first end, such as a threaded portion configured to engage with the partition wall and / or the intermediate component(s). Alternatively, or in addition, the bracket assembly comprises a fastening component(s) such as a nut(s) and bolt(s) or a screw(s) configured to connect the shaft to the partition wall and / or the intermediate component(s).

Preferably, a second end of the shaft is provided with a stop, such as a flange, configured to, in use, prevent the bracket from sliding upwardly beyond the shaft and hence disengaging therefrom.

Preferably, the bracket has a profile formed substantially as a truncated V-shape, comprising a central portion and a pair of angled wing portions. Preferably, the wing portions are configured to, in use, be connected to the overhead structure via linking components.

Preferably, the linking components comprise arm portions and connecting flanges, wherein the arm portions are configured to connect at a first end to the wing portions and at a second end to the connecting flanges and the connecting flanges are configured to connect to the structure over.

Preferably, the central portion of the bracket comprises an aperture configured to, in use, accommodate the shaft to enable the bracket to be in a sliding relationship relative to the shaft.

Preferably, the bracket is configured to, in use, be rotatable about the shaft.

Preferably, the bracket assembly comprises one or more stabilising members configured to promote the sliding relationship of the bracket relative to the shaft and limit tilting or slanting of the bracket relative to the shaft.

Preferably, the stabilising member(s) comprise an upper and / or lower stabilising member connected to the bracket above and below the bracket (respectively), the stabilising member(s) configured with an aperture substantially complementary to the cross-section of the shaft, wherein the stabilising member(s) have a height such that the stabilising member(s) form a collar with the aperture therethrough defining a passageway such that, in use, the stabilising member(s) serve as a guide(s) to stabilise or steady the sliding movement of the bracket relative to the shaft.

Preferably, the bracket assembly comprises an upper stabilising member disposed above the bracket and a lower stabilising member disposed below the bracket.

Preferably, the upper stabilising member comprises a nut having an inner thread and the lower stabilising member has a body portion and a neck portion, the neck portion having an external thread complementary to the inner thread of the nut, wherein the neck portion is configured to, in use, pass through the aperture on the central portion of the bracket to threadingly engage with the nut such that the upper and lower stabilising member are connected together with the central portion of the bracket clamped between them.

Preferably, the neutral position of the bracket is between the first and second end of the shaft.

Preferably, the neutral position of the bracket is substantially midway between the first and second end of the shaft.

Preferably, the neutral position of the bracket is between substantially 30mm and 80mm from the upper surface of the partition wall. More preferably, the neutral position of the bracket is substantially 55mm from the upper surface of the partition wall.

Preferably, the first biasing means is disposed about at least a substantial portion of the shaft above or below the bracket.

Preferably, the first biasing means is configured and dimensioned such that, in use, it retains the bracket in the neutral position in the absence of applied forces on the bracket assembly and, when the bracket is displaced along the shaft, urges the bracket back towards the neutral position.

Preferably, the first biasing means is provided by at least one spring, such as a compression spring formed from wire coil.

Preferably, a wire diameter of the at least one spring is between substantially 0.90mm and 1.12mm; a spring rate of the at least one spring is between substantially 0.100 N/mm and 0.200 N/mm; and a number of active coils of the at least one spring is between 6 and 14.

More preferably, the wire diameter of the at least one spring is substantially 1.00mm; the spring rate of the at least one spring is substantially 0.186 N/mm; and the number of active coils of the at least one spring is 10.

Alternatively, the first biasing means is provided by at least one buffer formed from resilient material.

Preferably, the first biasing means is configured to be relaxed (that is, not under tension or compression) when the bracket is in the neutral position.

Preferably, the first biasing means is configured to be loaded (that is, placed under tension or compression) when the bracket is displaced along the shaft, such that as the first biasing means returns to its relaxed state it urges the bracket back towards the neutral position.

Preferably, the first biasing means is connected to the bracket and the shaft.

Preferably, the bracket assembly comprises a second biasing means, configured substantially similarly to the first biasing means, and disposed about the other portion of the shaft than the first biasing means; that is, above or below the bracket.

Preferably, the bracket assembly is configured to accommodate vertical displacement of the bracket along the shaft of up to substantially 20mm to 30mm in either direction from the neutral position; and more preferably up to substantially 25mm in either direction from the neutral position.

According to a second broad aspect of the invention, there is provided a method of assembling a bracket assembly substantially as described above, the method including the step of:

disposing the bracket and the first biasing means about the shaft.

According to a third broad aspect of the invention, there is provided a method of installing a bracket assembly substantially as described above in a building, the method comprising the steps of:

connecting the shaft to the non-structural component; and

connecting the bracket to the overhead structural component.

Preferably, connecting the bracket to the overhead structural component comprises using the linking components to connect the bracket to the permanent structural component, wherein the arm portions of the linking components are connected at a first end to the bracket, at a second end to the connecting flanges of the linking components, and the connecting flanges are connected to the overhead structural component.

The present invention provides a number of optional advantages, including at least:

- Providing a bracket assembly that allows connection between a non-structural component and an overhead structural component in a manner that is sturdy and robust while at the same time accommodating a measure of vertical deflection;
- At the same time, providing a bracket assembly that effectively limits lateral movement of the non-structural component relative to the overhead structural component;
- Providing a bracket assembly that is simple and convenient to install, and in particular that does not require the bracket to be held or temporarily fastened in the neutral position during installation, and also that allows the bracket to be rotated about the shaft during installation to position the bracket as required;
- Providing a bracket assembly that is relatively cost-effective and convenient to manufacture; and
- At the very least, providing the public with a useful choice.

DESCRIPTION

Further aspects and advantages of the present invention will become apparent from the following description which is given by way of example only and with reference to the accompanying drawings in which:

FIGURE 1 is an exploded view of a bracket assembly according to an exemplary preferred embodiment of the present invention;

FIGURE 2 is a side view of the bracket assembly of Figure 1 when assembled;

FIGURE 3 is a side view of a bracket assembly according to a first alternative exemplary embodiment of the invention; and

FIGURE 4 is a side view of a bracket assembly according to a second alternative exemplary embodiment of the invention.

The following description will describe the invention in relation to examples and/or drawings. The invention is in no way limited to the example(s) and/or drawings as they are purely to exemplify the invention only and variations and modifications may be readily apparent to the skilled person without departing from the scope of the invention.

Figures 1 and **2** show an exemplary first preferred embodiment of the bracket assembly (generally indicated by 100) configured to connect a non-structural partition wall (not shown) to a roof structure (not shown). It will however be appreciated that the bracket assembly (100) may equally be used to connect other types of non-structural component, such as a ceiling grid, to other types of overhead structural component, such as a floor structure of a storey of the building directly above a space where the temporary structural component is located.

The bracket assembly (100) of this embodiment comprises a shaft (102); a bracket (110); an upper (122) and lower (124) stabilising member; and a first (130) and second (132) biasing means.

The shaft (102) is configured to engage at its first (lower) end with a plinth (106), with a fastener (104) passing through both components to connect them. The plinth (106) in turn

connects to a head track (not shown) at a top end of the partition wall (not shown), via fastening means (not shown) which are passed through apertures (106a) on the plinth (106). It will be appreciated that other configurations for effecting the connection between the shaft (102) and the partition wall (not shown) are equally possible.

At its second (upper) end, the shaft (102) includes a flange (108) to prevent other components of the bracket (110) and stabilising members (122, 124) from sliding too far upwards and disengaging from the shaft (102).

The bracket (110) has a truncated V-shaped profile including a central portion (116) and a pair of angled wing portions (118). It will however be appreciated that the bracket may have other configurations, such as a tapered truncated V-shape, or even a continuous or substantially continuous arced profile. The arms of the bracket may also be configured unevenly (i.e. at different angles relative to the central portion), for instance if the bracket is configured for installation proximate a wall or to fit around utilities in the ceiling cavity.

The central portion (116) of the bracket (110) comprises an aperture (120), which in this embodiment is somewhat larger than a cross-section of the shaft (102) for the reasons discussed below. In use, the shaft (102) is disposed in the aperture (120), allowing the bracket (110) to slide up and down relative to the shaft (102). The bracket (110) is also able to rotate about the shaft (102), allowing the bracket (110) to be easily positioned as required during installation.

The wing portions (118) of the bracket (110) are provided with a series of fixing apertures (112) configured to, in use, engage arm portions (not shown) of linking components (not shown) which in turn connect to the structure over (not shown) via linking flanges (not shown).

The bracket assembly (100) of this embodiment comprises an upper stabilising member (122) and a lower stabilising member (124) as described below, the stabilising members (122, 124) each configured as a collar.

The upper stabilising member (122) is configured as a nut having an internal thread (122a). The lower stabilising member (124) has a cross-section formed substantially as an inverted T-shape, comprising a body portion (124a) and a relatively narrow neck portion (124b)

having an external thread corresponding to that of the nut (122, 122a). The neck portion (124b) is somewhat smaller than the aperture (120) on the central portion (116) of the bracket (110). Both the upper and second lower component (122, 124) comprise a passageway (128a, 128b) passing therethrough, the passageway (128a, 128b) being substantially complementary to the cross-section of the shaft (102).

In use, the neck portion (124b) is passed through the aperture (120) on the bracket (110) and threadingly engages with the nut (122), thereby clamping the central portion (116) of the bracket (110) between the nut (122) and the body portion (124a) of the lower stabilising member (124), as shown in **Figure 2**. The passageways (128a, 128b) on the stabilising members (122, 124) act as "guides" for movement of the bracket (110) up and down the shaft (102), and in particular help prevent the bracket (110) from slanting or tilting.

It will however be appreciated that a range of other configurations of the stabilising member(s) are possible. For example, the stabilising member(s) may be manufactured integrally with the central portion of the bracket, rather than being provided by separate components. There may also be just an upper or lower stabilising member, rather than both.

In still another example, the bracket assembly may be configured without stabilising members at all. For instance, the central portion of the bracket may be relatively thick, such that it itself provides a passageway (defined by its central aperture) that assists in guiding and stabilising the bracket. It is even conceivable that, in a particular technical situation, added stability may not be necessary at all and hence the bracket can be slidingly disposed about the shaft on its own, without additional stabilising means.

The bracket assembly (100) of this embodiment comprises both a first (130) and second (132) biasing means, disposed about the shaft (102) below and above the bracket (110), respectively. It will however be appreciated that, as exampled below, the bracket assembly may be configured with just a single biasing means.

In this embodiment, both biasing means (130, 132) are provided by compression springs. However, it will be appreciated that the biasing means may alternatively be provided by a different material(s) and / or component(s), such as a resilient rubber material.

The first compression spring (130) maintains the bracket (110) in a neutral position in the absence of applied forces, as shown in **Figure 2.**

In this embodiment, in the neutral position the central portion (116) of the bracket (110) sits substantially 55mm from the top of the partition wall (not shown). This is also substantially midway along the length of the shaft. The neutral position of the bracket being relatively low above the partition wall in this manner means that the bracket assembly is less reactive to, and hence better able to withstand, lateral (sideways) forces.

However, it will of course be appreciated that the particular distance and / or proportions may be varied to suit the technical requirements of a given situation and the skilled person will readily envisage ways of achieving this, for instance, by varying the overall length of the shaft and / or by dimensioning the biasing means to maintain the bracket at a particular position along the shaft when in the neutral position.

In case of downward vertical deflection, that is, when the bracket (110) moves downwardly, the first compression spring (130) will compress to absorb this movement and then urge the bracket (110) back towards the neutral position; and the second compression spring (132) will do the same in the case of upward vertical deflection. In this embodiment, the bracket assembly (100) is configured to tolerate vertical deflection of the bracket (100) by substantially 25mm in either direction from the neutral position. However, it will be appreciated that this distance may be varied and the skilled person will readily envisage means of achieving this.

By virtue of the bracket assembly (100) having a first and second compression spring (130, 132), configured, respectively, to absorb upward and downward vertical deflection of the bracket (110), the first and second compression spring (130, 132) need not be connected to the bracket (110) or the shaft (102) since neither spring (130, 132) needs to exert a tensile force on the bracket (110) (although they may be so connected if desired).

Figures 3 and **4** show alternative exemplary embodiments each having only one spring (230, 332, respectively), wherein in both cases the spring (230, 332) is connected to the bracket (110) and the shaft (102) as discussed in more detail below. Connection of the

spring (230, 332) to the bracket (110) and shaft (102) may be accomplished by any conventional means, such as welding, adhesion, ties or bolting.

In the embodiment of **Figure 3**, the bracket assembly (generally indicated by 200) only comprises a spring (230) below the bracket (110). The spring (230) is connected to the bracket (110), more particularly to the lower stabilising member (124), at its top end as schematically indicated by (234). The spring (230) is also connected to the shaft (102) at its bottom end as schematically indicated by (232). The spring (230) being connected in this manner enables it to account for both upward and downward deflection of the bracket (110); in the latter case by compression, as discussed above in relation to **Figures 1** and **2**, and in the former case by exerting a tensile force on the bracket (110).

However, it will be appreciated that the embodiment of **Figure 3** would also be functional without connection of the spring (230) to the bracket (110) or shaft (102) in this manner, albeit with upward deflection of the bracket (110) not being absorbed and hence potentially a less effective system.

In the embodiment of **Figure 4**, the bracket assembly (generally indicated by 300) only comprises a spring (332) above the bracket (110). The spring (332) is connected to the bracket (110), more particularly to the nut (122), at its bottom end as schematically indicated by (334). The spring (332) is also connected to the shaft (102) at its top end as schematically indicated by (336). The spring (332) being connected in this manner enables it, firstly, to keep the bracket (110) suspended in the neutral position absent applied loading; and, secondly, to account for both upward and downward deflection of the bracket (110) by compression and tension, respectively. The embodiment of **Figure 4** would also conceivably be functional if the spring (332) were unconnected to the bracket (110) or shaft (102), albeit that the bracket (110) and spring (332) would slide downwardly along the shaft (102) under gravity such that the neutral position (110) of the bracket would be proximate the first end of the shaft (102).

It will be appreciated that the bracket assembly of the present invention is advantageous in a number of respects. It provides a means of connection between the partition wall and the roof structure that allows for a measure of vertical deflection by virtue of the slidable bracket and the biasing means. It also effectively resists lateral loading, particularly in

embodiments wherein a stabilising member(s) is present as part of the bracket assembly. The bracket assembly can also be easily and conveniently fitted as the biasing means maintains the bracket in the neutral position during installation, avoiding the need for the bracket to be manually held (or otherwise temporarily fixed) in place. Installation is further facilitated by the bracket being able to rotate relative to the shaft, allowing the bracket to be easily positioned or repositioned as required.

It will of course be realized that while the foregoing has been given by way of illustrative example of this invention, all such and other modifications and variations thereto as would be apparent to persons skilled in the art are deemed to fall within the broad scope and ambit of this invention as is hereinbefore described.

If any reference numeral(s) is/are used in a claim or claims then such reference numeral(s) should not be considered as limiting the scope of that respective claim or claims(s) to any particular embodiment of the drawings.

It is acknowledged that the term ‘comprise’ may, under varying jurisdictions, be attributed with either an exclusive or an inclusive meaning. For the purpose of this specification, and unless otherwise noted, the term ‘comprise’ shall have an inclusive meaning - i.e. it will be taken to mean an inclusion of not only the listed components it directly references, but also other non-specified components or elements. This rationale will also be used when the term ‘comprised’ or 'comprising' is used in relation to one or more steps in a method or process.

PROVISIONAL CLAIM 1:

A bracket assembly for connecting a non-structural component of a building to an overhead structural component of the building, the bracket assembly comprising:

a shaft configured to, in use, be connectable to the non-structural component; and

a bracket disposed about the shaft and configured to, in use, be connectable to the overhead structural component

wherein the bracket is in a sliding relationship relative to the shaft, wherein the bracket assembly further comprises a first biasing means disposed about the shaft above or below the bracket and configured to, in use, urge the bracket into a neutral position along the shaft, being the position of the bracket in the absence of applied forces acting on the bracket.

ABSTRACT:

Conventional bracket assemblies for connecting a non-structural component (such as a partition wall) of a building to an overhead structural component thereof may tend to lack the ability to accommodate vertical deflection as between the non-structural component and the overhead structural component. The present invention comprises a bracket assembly having a shaft configured to, in use, be connectable to the non-structural component, a bracket disposed about the shaft and configured to, in use, be connectable to the overhead structural component, wherein the bracket is in a sliding relationship relative to the shaft, and a first biasing means disposed about the shaft above or below the bracket and configured to, in use, urge the bracket into a neutral position along the shaft, being the position of the bracket in the absence of applied forces acting on the bracket. The bracket assembly of the present invention thereby enables connection between the non-structural component and the overhead structural component that accommodates vertical movement while limiting lateral movement; and in addition is convenient to install.

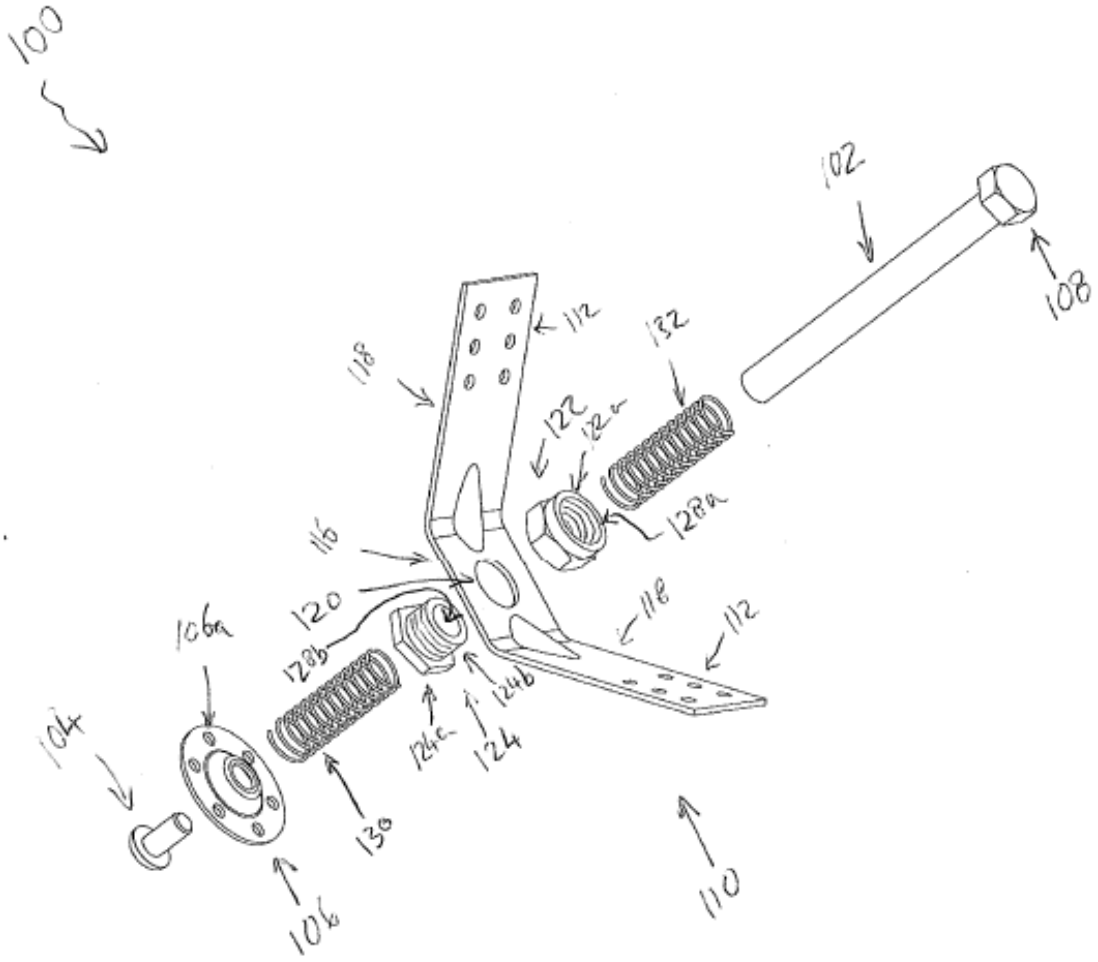
100
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Figure 1

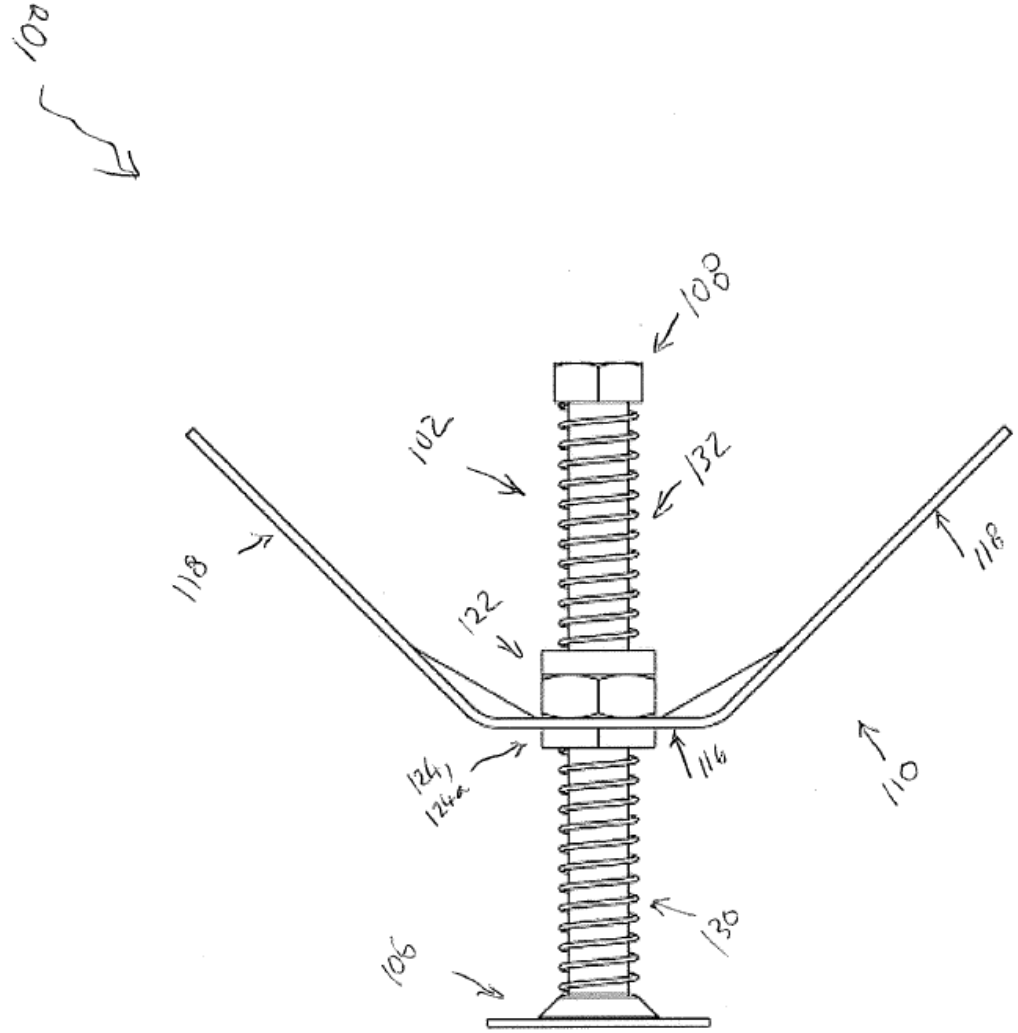

Figure 2

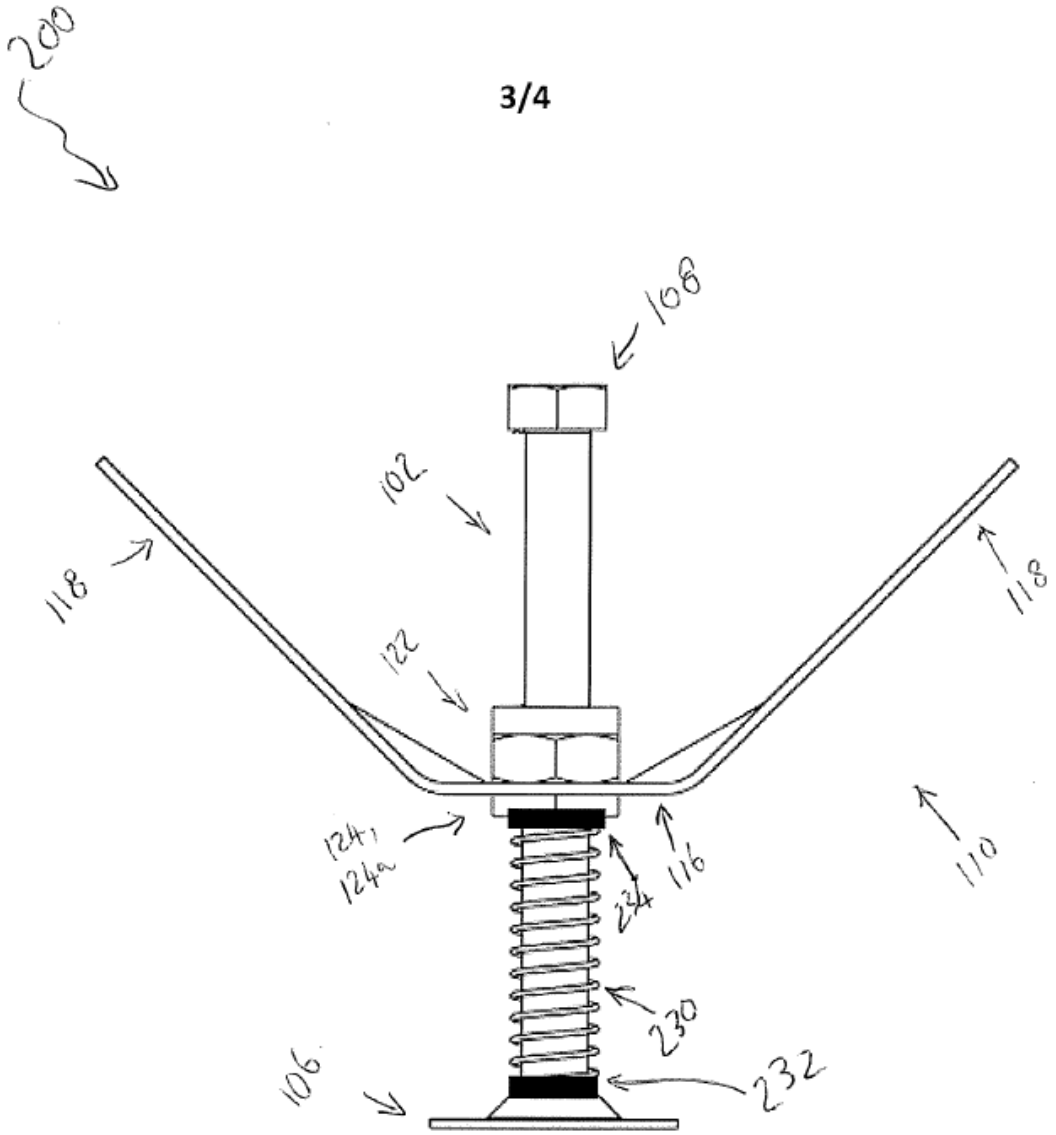

Figure 3

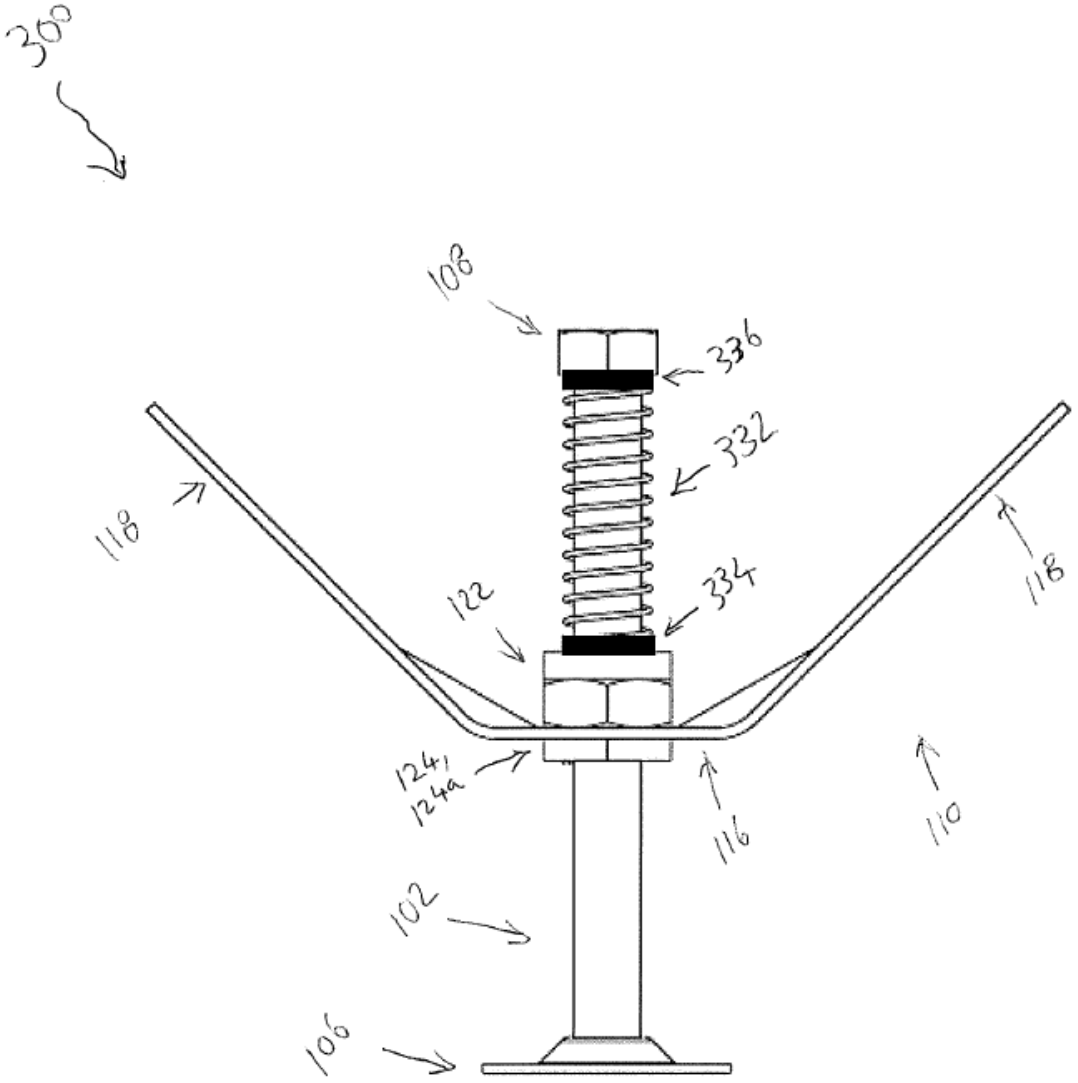

Figure 4