

Service outlet box

The present invention relates to service outlet boxes, and in particular, but not exclusively, to screed floor service outlet boxes and attachment arrangements therefor.

Service outlet boxes are typically used in offices, factories or other commercial premises in which electrical or electronic services are required at a variety of different locations. Such service outlet boxes are typically fitted in the floor. The electrical or electronic services available from such service outlet boxes may for example include telephone, Internet, network and other telecommunication- or data-related services, and electric power. Service outlet boxes for installation within the floor space are particularly beneficial in offices or buildings that require flexible usage of the space within the building. Providing such service outlet boxes in several locations in a floor space may for example enable the floor space to be partitioned with quick-to-fit partition walls and to be readily used without needing to route cables through or from walls in the partitioned space.

A type of outlet box for use on screed floors is often referred to as a screed floor outlet box. A known screed floor outlet box comprises a multi-piece base frame including a rectangular base plate, side-walls and cast blocks attached at each corner. This known outlet box is secured to the floor substrate using a fastener placed through a hole in each of the corners of the base plate. These corners of the base plate tend to be susceptible to damage caused, for example, by the outlet box being dropped on the floor prior to installation. If the corners become damaged it is often difficult to secure the outlet box onto the floor substrate and the outlet box may need to be replaced.

In some suggested outlet box arrangements, an outlet box may be secured at locations on the interior of the base unit frame. Whilst this may mitigate, to some extent, the likelihood of damage being caused to the attachment portion of the outlet box, such arrangements may lead to debris and foreign bodies collecting in the box during and after it has been attached to the floor substrate.

For some designs of outlet box, it has also been found to be difficult to provide a securing location without unduly increasing the manufacturing cost, or at least offsetting other cost benefits provided by the design in question.

The present invention seeks to mitigate or remove at least one of the above-mentioned disadvantages.

According to a first aspect of the invention, there is provided a screed floor outlet box base assembly having a fixing bracket mounted thereon, wherein the fixing bracket is mounted on the base assembly so as to be moveable from a first position to a second position, the bracket in the second position being suitable for attaching the box base assembly to a structure to which the base assembly is to be fixed.

By providing an arrangement in which the fixing bracket is mounted so as to be moveable from the first to the second positions, the likelihood of the fixing bracket becoming damaged during, for example installation, can be reduced.

It will be understood that the fixing bracket may be arranged to receive a variety of different types of fastener for securing the outlet box base assembly to the structure to which the base assembly is to be fixed. The fixing bracket, in the second position, preferably provides a fixing plate defining an opening through which a fastener for securing the base assembly to the structure may be placed. The opening may for example be suitable for receiving a nail or a screw.

The structure to which the base assembly is to be fixed may take a number of forms. The structure is preferably a floor substrate onto which screed may be introduced, but may alternatively be other parts of a floor structure such as a part of the internal structure of a building (for example a joist).

The base assembly is preferably arranged such that the fixing bracket is mounted on the base unit assembly during movement between the first and second positions. The fixing bracket may not need to be detached from the base assembly to move it from the first to the second position. The fixing bracket may be rotatably mounted on the base assembly so as to be moveable from the first position to the second position. In an embodiment of the invention described herein, the fixing bracket is rotatable through approximately a right-angle to move from the first position to the second position. In other embodiments of the invention, the fixing bracket may be moveably mounted in other ways. For example, the fixing bracket may be slideably mounted on the base assembly so as to be moveable from the first position to the second position.

The fixing bracket, in the first position, may be positioned alongside the base assembly. The fixing bracket, in the first position, may be substantially flush with the base assembly. For example, the fixing bracket may be so dimensioned such that, in the first position, the structure of the fixing bracket lies flush against the structure of the base assembly. Thus, the fixing bracket in the first position may be protected, to some extent, from damage prior to installation of the device (for example during storage or transportation).

The fixing bracket is preferably releaseably held in the first position. The base assembly and/or fixing bracket is preferably arranged such that the fixing bracket is

releaseably held in the first position by way of a snap- or friction-fit.

The base assembly may have a larger footprint when the fixing bracket is in the second position, than when the fixing bracket is in the first position. The footprint of the base assembly will be readily identifiable to the skilled man. In the event of any uncertainty, the footprint should be interpreted as the area covered by the base assembly and fixing bracket when viewed in plan view from above.

The base assembly may define an interior space for housing electrical components. The fixing bracket, in the second position, may define an attachment location outside the interior space. Embodiments of the present invention may therefore reduce the possibility of debris (for example caused when the outlet box is being installed and secured to a floor substrate) collecting in the interior of the outlet box, where it may need to be removed and/or may interfere with components housed therein.

In the second position, the fixing bracket may protrude substantially perpendicularly to an edge of the base assembly. The fixing bracket, in the second position, preferably lies substantially parallel to the bottom surface of the base assembly. The fixing bracket, in the second position, may thus extend in the plane of the bottom surface of the base assembly.

The base assembly may be a number of different shapes (referring to the shape of the base assembly in plan view). For example, the base assembly may be substantially rectangular and may or may not be substantially square.

The base assembly may comprise a multiplicity of fixing brackets each being moveable from a first position to a second position, each of the brackets in the second position being suitable for attaching the screed floor outlet box base

assembly to the structure to which the base assembly is to be fixed. The fixing brackets may be located on, for example, the corners of the base assembly.

5 The base assembly may include a base frame for attaching to a floor substrate over which a screed is to be laid, wherein the base frame is formed from one or more metal sheets bent approximately into the shape of a cuboid and comprising a bottom face, side faces and an open top over which a lid frame assembly is to be received. The base frame is preferably
10 formed from a single metal sheet. Embodiments of the present invention have been found to be particularly beneficial when used on such a base assembly. For example, this above-described base assembly can be relatively cheap to manufacture, especially if it is not necessary to integrate
15 fixing locations directly with the one-piece base unit. Embodiments of the present invention may therefore enable these cost savings to be realised whilst only adding relatively small additional costs.

The base assembly may further comprise a screed cover
20 portion.

A screed floor outlet box base assembly is typically installed in a structure prior to an associated lid assembly being mounted on the outlet box. According to a further aspect of the invention, there is provided a screed floor
25 outlet box comprising a lid assembly and a base assembly having a fixing bracket mounted thereon, the base assembly being arranged in accordance with any aspect of the invention as described herein.

The screed floor outlet box is preferably for use as a
30 floor box into which external devices (such as computers, phones etc.) can be plugged in, but may also, in some embodiments of the invention, be for use as a junction box.

According to yet another aspect of the invention there is provided a floor structure comprising at least one screed floor outlet box base assembly having a fixing bracket as described herein. Preferably the floor structure comprises a screed floor outlet box mounted therein, the screed floor outlet box comprising a lid assembly and a base assembly and being in accordance with the screed floor outlet box according to any aspect of the invention as described herein. The floor structure may comprise a multiplicity of screed floor outlet boxes mounted therein. The multiplicity of screed floor outlet boxes are preferably screed floor outlet boxes in accordance with any aspect of the invention as described herein.

The floor structure may comprise a plurality of screed floor outlet box base assemblies mounted on the floor substrate in preparation for the introduction of screed onto the substrate. Preferably, however, the floor structure comprises a region of screed floor (i.e. with screed laid onto the substrate).

The floor structure may include one or more cables in the floor, the one or more cables terminating inside the outlet box at a terminal defined by a socket, to which a further cable may be attached for connecting to a device positioned above the floor in the region of the screed floor outlet box. (The term "cable" is intended to encompass any electronic, electrical or optical cord, line, wire, fibres or the like that can convey signals or power from one location to another.) The floor structure is preferably part of a building.

According to yet another aspect of the invention there is provided a kit of parts including a base assembly and a fixing bracket suitable for use as the base assembly and fixing

bracket according to any aspect of the invention described herein.

It will be appreciated that features described with reference to one or more aspects of the invention may be
5 equally applicable to other aspects of the invention. For example, features described herein only with reference to the screed floor outlet box, are equally applicable to the screed floor outlet box base assembly and vice versa.

An embodiment of the invention will now be described, by
10 way of example only, with reference to the accompanying schematic drawings of which:

Figure 1 is an isometric view of a base assembly of a screed floor outlet box according to a first embodiment of the invention;

15 Figure 2 is an isometric view of a lid frame assembly for the screed floor outlet box according to the first embodiment of the invention;

Figure 3a is an exploded view of the base assembly for the screed floor outlet box according to a first embodiment of
20 the invention;

Figure 3b is an exploded view of the lid frame assembly of Figure 2;

Figure 4 is a schematic plan view of the socket arrangement in the screed floor outlet box of the first
25 embodiment of the invention;

Figure 5 is a schematic plan view of the socket arrangement in the screed floor outlet box of the first embodiment of the invention, showing a plug received in a socket;

30 Figure 6a is an isometric view of part of the base assembly for the screed floor outlet box according to a first embodiment of the invention, together with a fixing bracket

(shown in the stowed position) for use on the base assembly;
and

Figure 6b is another isometric view of the part of the
base assembly for the screed floor outlet box according to a
5 first embodiment of the invention, together with the fixing
bracket (shown in the deployed position).

Figures 1 to 6b show a screed floor outlet box according
to a first embodiment of the invention. The outlet box
comprises two main portions: a base assembly 5 and a lid frame
10 assembly 7 mountable on the base assembly.

The base assembly 5 of the outlet box is shown in Figure
1 in its packaged form ready for installation. Accordingly,
the base assembly includes a screed cover 3. The screed cover
3 is typically kept in place following installation of the
15 base assembly 5 onto a floor and prevents foreign bodies
entering the base frame during construction of other parts of
the floor, and especially during the laying of the screed.
The screed cover 3 is removed when the lid frame assembly 7
(Figure 2 and Figure 3b) is installed.

20 Referring first to the base assembly 5 in detail, the
structure of the assembly is primarily defined by a main base
frame 9. The main base frame 9 defines a cuboid with a square
bottom face 11, four side faces 13, and an open upper face.
It is formed from a single piece of galvanised steel plate.
25 During manufacture, an appropriately dimensioned plate is
punched out or stamped from a piece of sheet steel (the
various openings and fixing holes in the main base frame are
also formed in the plate during this punching / stamping
procedure). The plate is then folded in an appropriate manner
30 such that the main base frame 9 achieves the cuboid form shown
in Figures 1, 3a, 6a and 6b.

The four side faces 13 of the main base frame 9 extend
perpendicularly upwards from the bottom face 11. The side

faces 13 include lateral extensions 13a which are folded through a right angle, and spot welded, onto the neighbouring side face. This corner flange arrangement provides the base frame with extra rigidity and improves the ability to seal the
5 screed box at its corners.

Each side face 13 has a rectangular opening 14 which may be covered by a side-plate 15a or 15b. The side plates are fixed onto the part of the base frame structure surrounding the openings. In the embodiment shown in Figures 1 to 6b, two
10 opposing side plates 15a are made of sheet steel and include three openings (not shown) for receiving electrical cables (not shown). The other two side-plates 15b are also made of sheet metal and close the side of the frame to which they are connected.

15 A laterally inwardly projecting flange 17 is located on the upper edge of each opening 14 in the side faces. These flanges 17 are formed by folding portions of the side faces inwardly towards the middle of the base frame 9. The flanges 17 serve a dual-function; they support the accessory tray 19
20 and also provide the base with increased structural rigidity.

The interior of the main base frame 9 houses four ratchet sleeves 21 (one positioned on the interior of each corner of the base frame). Each ratchet sleeve 21 is a one-piece plastic moulding and is attached to the bottom surface 11 of
25 the base frame 9 by a screw inserted from beneath the base frame. The ratchet sleeves 21 are arranged to accommodate ratchet pins 23 in the lid frame assembly (see below with reference to Figures 2 and 3b).

There are also four support pillars 25 attached to the
30 bottom surface of the base frame 9. The support pillars 25 are held in place on bolts inserted from beneath the base frame. Each support pillar 25 has an internal thread running through its central bore. The upper part of the pillar

therefore also provides a fixing location for a short bolt inserted through a hole in the accessory tray 19 to fix the tray in place. The support pillars 25 also support the tray 19 at a height above the bottom face of the base frame 9 to
5 allow cables and the like to be accommodated in the floor box. Two segregators 27 and two segregator adjustors 29 are provided inside the base frame 9 to manage and separate cabling (not shown).

The top face of the base frame 9 is open for
10 accommodating the accessory tray 19, the lid frame assembly 7 and other associated components described below.

Figures 4 and 5 (to which particular reference is now made) are schematic drawings showing a plan view of the accessory tray and the sockets of the service outlet box
15 according to the first embodiment of the invention. For the sake of clarity, the lid frame assembly and other surrounding structure is not shown.

The accessory tray 19 has a central cut-out portion 31 (see Figure 3a) through which three pairs 61a, 61b, 61c of
20 plug sockets 63 are exposed. The sockets 63 may be in a number of different forms, however in the first embodiment of the invention, the sockets 63 are for BS 1363 three-pin electrical plugs. Further embodiments of the invention (not shown) include sockets for telecommunication devices, data
25 transfer devices, two-pin plugs etc. The sockets are positioned at the termination of the cables (not shown) which feed into the base of the box. (The term "cable" is intended to encompass any electronic, electrical or optical cord, line, wire, fibres or the like that can convey signals or power from
30 one location to another.) In the first embodiment, and further embodiments, all the sockets share the common characteristic that they are suitable for receiving a plug

attached to a cable extending in a direction perpendicular to the direction in which the plug is inserted into the socket.

In the first embodiment of the invention, all the sockets are co-planar.

5 In accordance with a known socket for a BS 1363 three-pin electrical plug, the sockets 63 each comprise three rectangular openings 65 arranged in a triangular formation for receiving corresponding pins on the plug. The triangular formation has a height (labelled h in Figure 4) and a width
10 (labelled w in Figure 4).

Each pair of sockets 61a, 61b, and 61c comprises two sockets 63 located adjacent to each other in a side-by-side relationship. The first pair 61a (located towards the bottom of the page in Figures 4 and 5), the second pair 61b (located
15 towards the centre of the page in figures 4 and 5) and the third pair 61c (located towards the top of the page in Figures 4 and 5) are arranged in parallel rows. The rows are parallel to the lower edge 67 of the outlet box (i.e. parallel to the width W direction of the outlet box).

20 All the sockets 63 in the outlet box are similarly orientated. The socket orientation is such that when a plug 69 is received in one of the sockets 63 of the second pair of sockets 61b (see Figure 5), the cable 71 runs directly away from the plug 69 in a direction perpendicular to the width W
25 of the outlet box and through the cord outlets 41 (not shown in Figures 4 and 5). The part of the cable 71 extending directly away from the plug lies in a plane parallel to the top of the outlet box. In the first embodiment of the invention, the cable 71 therefore lies in a plane parallel to
30 the plane containing the load plate 39 (when the lid is in the closed position).

The pairs of sockets 61a, 61b, 61c are each housed in substantially identical, rectangular, modular units (mounted

in the base assembly). The modular unit of the second (central) pair of sockets 61b, is staggered with respect to the first and third (lower and upper) pairs of sockets 61a, 61c. The stagger is in a direction parallel to the width w of the triangular formation (and parallel to the width W of the outlet box). The pairs of sockets are staggered such that none of the rectangular openings 65 in the sockets of the second pair 61b, overlap with any openings 65 in another socket (the overlap being considered in a direction parallel to the width w of the triangular formations).

The pairs of sockets 61a, 61b, 61c are thus staggered such that the cable 71 extending directly away from the plug 69 passes between the sockets of the first pair 61a (see Figure 5). Thus, plugs which are received in the sockets of the first pair tend not to obstruct the cable 71 extending away from the plug 69 in the second pair. This arrangement may therefore mitigate undesirable stresses on the plug 69, when a large number of the sockets are occupied.

Figures 6a and 6b are isometric views of the main base frame 9 on the screed floor outlet box according to the first embodiment of the invention. In Figure 6a, a fixing bracket 33 is shown in a stowed position, and in Figure 6b the fixing bracket 33 is shown in a deployed position. For the sake of clarity, only one corner of the main base portion is shown to have a bracket in Figures 6a and 6b, but it will be appreciated that a fixing bracket is, in practice, mounted on each corner (see Figure 3a). The fixing bracket 33 is also shown separately, to one side of the base frame in Figures 6a and 6b.

The fixing bracket 33 is rotatably mounted on the outside of each corner of the base assembly 5. Each bracket 33 is moveable between the deployed position (shown in Figure 6b) and the stored position (shown in Figure 6a, and in exploded

view in Figure 3a). The brackets are each stamped from metal sheeting and are defined by two plate portions folded such that they are at right angles to one another. In the stored position, the two plate portions lie flush with the sides of the base assembly. In the deployed position, the brackets 33 protrude outwardly from the corners of the base, and define a fixing plate which is parallel to the bottom surface 11 of the base frame 9. The brackets thereby define fixing locations at which the base frame 9 can be attached to a floor substrate.

10 In the stored position the brackets 33 are rotated upwardly by 90 degrees from the deployed position and thus lie flush with the side faces of the base.

Each fixing bracket 33 is attached to the base assembly using a rivet which passes through the lower plate portion of the bracket, and through a small hole in the base frame 9. The mounting of the fixing bracket on the base frame is a friction-fit (i.e. there is slight resistance to rotation that can be overcome by, for example, the user pulling the top of the fixing bracket away from the frame).

20 Known screed floor boxes typically comprise a multi-piece base frame (for example a base plate, with cast blocks attached at each corner, and side-walls attached thereto). These floor boxes tend to be secured to the floor substrate directly through the corners of the base plate. The bracket arrangement of the first embodiment of the invention provides a number of benefits over the above-described screed boxes. For example, the brackets in the deployed position extend outside of the interior of the base frame. The screed box of the first embodiment of the invention does not therefore tend to collect debris and foreign bodies when it is being attached to the floor (as can be a problem in known screed boxes).

30 Furthermore, the bracket arrangement provides a relatively cheap fixing arrangement, especially when used in combination

with the one-piece base frame. Yet further, the brackets may be less prone to damage during transport, handling or installation of the floor box, than the corners of the base plate in known screed floor outlet boxes.

5 Referring now to Figure 3b and the lid frame assembly 7 in detail, the lid frame assembly 7 generally comprises a lid frame 35, four ratchet pins 23, a lid 37 moulded from plastics material and hinged to one edge of the lid frame 35, and a
10 load plate 39 with a pair of cord outlets 41 associated with the lid.

The lid frame 35 is a single piece plastic moulding, and includes, at the interior of each corner, a hole 43 in which one of the ratchet pins 23 is housed. The ratchet pins are held in the holes 43 by way of a snap-fit which allows the pin
15 to rotate about its axis in the hole, but retains the pin axially in the hole 43.

The lid frame 35 has complementary dimensions to the bottom face of the base assembly 5. Thus when the lid frame assembly 7 is lowered onto the base 5, the four ratchet pins
20 23 are received in the ratchet sleeves 21 in the base assembly 5.

The ratchet pin 23 and the ratchet sleeve 21 at each of the four corners of the box, together define a ratchet mechanism that selectively allows movement in a direction
25 along the axis of the ratchet pin 23. The lid frame 35 of the box may thus be moved relative to the base 5, by means of the ratchet mechanisms 21, 23. This ensures that the lid both (a) lies flush and level with the surrounding floor and (b) is secured in place. The ratchet mechanisms also allow the lid
30 to self-level over time if there is settlement or movement of the floor or its covering over time.

The ratchet pin 23 may be twisted by 90 degrees about its axis between a locked position and a release position. In the

locked position the ratchet mechanism defined by the pin 23 and sleeve 21 prevents the lid frame 35 from being lifted off the base of the box. In the release position, the ratchet mechanism is disengaged. Thus, when the ratchet pins 23 of
5 all four ratchet mechanisms are twisted to the release position, the lid frame 35 and lid 37 may be lifted off and completely removed from the base of the box 5. To facilitate twisting of the ratchet pins 23 between the locked position and release position, the top of the each pin is provided with
10 a protrusion 23a which the user can manipulate to rotate the pin about its axis. The orientation of the protrusion 23 also allows the state of the pin to be readily identified.

The lid 37 is hinged to the lid frame 35 along its rear edge (as shown in Figure 3). The lid 37 is therefore moveable
15 from the closed position (as shown in Figures 2 and 3) to an open position (not shown) for providing access to the space inside the box, and thus access to the sockets exposed through the cut-out 31 in the accessory tray 19.

To facilitate opening and closing of the lid 37, a handle
20 45 is provided. The downwardly extending arms of the handle 45 of inverted U-shape are slideably mounted in two cylindrical housings 47 in the lid (but have inwardly bent ends that are constrained at the top of the cylindrical housings such that they cannot be completely removed). The
25 top of the handle 45 is therefore able to lie flush with the lid surface whilst it is not being used, but can be lifted slightly away from the lid surface to provide the user with a better grip when the lid 37 is to be opened.

The underside of each of the cylindrical housings 47 is
30 closed. This removes the possibility of the handle arms contacting any electrical cabling inside the outlet box.

During use of the outlet box, cables from plugs connected to the sockets, pass out of the box through the lid via the

cable outlets 41. The cable outlets 41 are rotatably mounted on the lid 37 and moveable between closed positions (see Figure 2) in which they are flush with the lid assembly 7, and open positions in which they are raised above the surface to allow the cables to pass out of the box.

The lid frame assembly 7 includes a metal load plate 39 coupled with the lid 37. The load plate 39 supports and distributes loads experienced by the outlet box during use (for example loads caused by people walking or standing on the box). The load plate 39 is cut-away at the locations of the cord outlets and thus includes three protrusions on its front edge between which two recesses are defined. The central protrusion 48 includes two scalloped recesses 49 in its top face to improve the stiffness/load bearing capacity of the plate and also to enable easy access to the handle. The two side protrusions 51 are flat.

When the lid is assembled, the outer protrusions on the load plate 39 are located under corresponding projecting moulded parts of the lid. A dummy module 57 (comprising a unitary plastic moulding) is fitted over the central protrusion 48. In other embodiments, the dummy module may be replaced by, for example a locking module. The provision of the three protrusions gives the lid assembly of the floor box an improved load bearing capacity.

Whilst the present invention has been described and illustrated with reference to a particular embodiment, it will be appreciated by those of ordinary skill in the art that the invention lends itself to many different variations not specifically illustrated herein. It will also be appreciated by the reader that integers or features of the invention that are described as preferable, advantageous, convenient or the like are optional and do not limit the scope of the independent claims.

Claims

1. A screed floor outlet box base assembly having a fixing bracket mounted thereon,

5 wherein the fixing bracket is mounted on the base assembly so as to be moveable from a first position to a second position, the bracket in the second position being suitable for attaching the base assembly to a structure to which the base assembly is to be fixed.

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2. A base assembly according to claim 1, wherein the fixing bracket is rotatably mounted on the base assembly so as to be moveable from the first position to the second position.

15 3. A base assembly according to claim 1 or claim 2, wherein the fixing bracket, in the first position, is positioned alongside the base assembly.

4. A base assembly according to any preceding claim, wherein
20 the fixing bracket, in the first position, is substantially flush with the base assembly.

5. A base assembly according to any preceding claim, wherein the base assembly defines an interior space for housing
25 electrical components, and the fixing bracket, in the second position, defines an attachment location outside the interior space.

6. A base assembly according to any preceding claim,
30 comprising a multiplicity of fixing brackets each being moveable from a first position to a second position, each of the brackets in the second position being suitable for

attaching the screed floor outlet box base assembly to the structure to which the base assembly is to be fixed.

7. A base assembly according to claim 6 wherein the fixing
5 brackets are located on corners of the base assembly.

8. A base assembly according to any preceding claim, including
a base frame for attaching to a floor substrate over which a
screed is to be laid, wherein the base frame is formed from
10 one or more metal sheets bent approximately into the shape of
a cuboid and comprising a bottom face, side faces and an open
top over which a lid frame assembly is to be received.

9. A base assembly according to claim 8, wherein the base
15 frame is formed from a single metal sheet.

10. A screed floor outlet box base assembly substantially as
described herein with reference to and as illustrated by the
accompanying drawings.

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11. A screed floor outlet box comprising a lid assembly and a
base assembly having a fixing bracket mounted thereon, the
base assembly being in accordance with any preceding claim.

25 12. A floor structure comprising at least one screed floor
outlet box mounted therein, the screed floor outlet box being
in accordance with the box of claim 11.

13. A floor structure according to claim 12, including one or
30 more cables in the floor, the one or more cables terminating
inside the outlet box at a terminal defined by a socket, to
which a further cable may be attached for connecting to a

device positioned above the floor in the region of the screed floor outlet box.

14. A kit of parts including a base assembly and a fixing
5 bracket, suitable for use as the base assembly and fixing
bracket of claims 1 to 10.