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(54) Title: MODULAR FRAMEWORK SUPPORT SYSTEMS

(57) Abstract: The present invention relates to modular framework support systems. In particular, it relates to framework support systems of the non-penetrative type particularly used for supporting heating and ventilating apparatus and other service and plant apparatus on a roof of a building. The application describes a support (10) for a modular framework system, the support comprising a planar foot (11) comprising a socket (12) having a substantially rectangular cross-section with a long axis and a short axis. The socket has a base and an opening. The socket is provided with one or more elongate ribs (25) between the base and the opening and extending into the socket. The socket further comprises a projection (20) extending upwardly from the base, the projection having a spine (21) aligned with the long axis of the socket. Preferably, each rib (25) has a stepped configuration such that an operatively lower portion of the rib extends further into the socket than an operatively upper portion of the rib.
Modular Framework Support Systems

The present invention relates to modular framework support systems. In particular, it relates to framework support systems of the non-penetrative type particularly used for supporting heating and ventilating apparatus and other service and plant apparatus on a roof of a building.

Modular framework support systems comprising a series of U-shaped channelled struts assembled into a framework are well known for supporting air conditioning and other plant apparatus on a roof of a building and spacing the plant from the roof material. There are many suppliers of such systems, but the components are typically not interchangeable. Two such manufacturers are Unistrut and Eurostrut (registered trade marks). The frameworks are also used in other areas, such as in suspending pipes and electrical cables from ceilings. However, when used to support plant on a roof, the systems require relatively large feet into which upright struts are placed in order to spread the weight of the framework and the supported plant and equipment over the surface of the roof. Single feet are known which are suitable to use with a range of strut sizes, but have an oversized socket in which the strut is held in place by a collar, but this arrangement can be difficult to manipulate during assembly of a framework construction and requires a range of collars to maintained in stock to suit every possible strut combination likely to be used. The present invention seeks to overcome this problem.

Accordingly, in its broadest sense, the present invention provides a support for a modular framework system, the support comprising a planar foot comprising a generally rectangular socket having a base and an opening, wherein each socket is provided with one or more elongate ribs between the base and the opening and extending into the socket. In preferred embodiments, the socket further comprises a projection extending upwardly from the base, the projection having a spine aligned with the long axis of the socket.

The rectangular cross-section of the socket preferably has adjacent sides or walls of unequal length.

Preferably, each rib has a stepped configuration such that an operatively lower portion of the rib extends further into the socket than an operatively upper portion of the rib.
Suitably, the spine includes at least one pair of fingers extending laterally therefrom, one finger on each side of the spine.

The above and other aspects of the present invention will now be described in further detail, by way of example only, with reference to the accompanying drawings, in which:

Figure 1 is a plan view of an embodiment of a modular framework support base in accordance with the present invention;

Figure 2 is a cross-sectional view along line B-B of Figure 1;

Figure 3 is a cross-sectional view along line C-C of Figure 1;

Figure 4 is a detail of the plan view of Figure 1;

Figure 5 is a perspective view of the base of Figure 1 with a first framework channel;

Figure 6 is a plan view of the arrangement of Figure 5;

Figure 7 is a perspective view of the base of Figure 1 with a second framework channel;

Figure 8 is a plan view of the arrangement of Figure 7;

Figure 9 is a perspective view of the base of Figure 1 with a third framework channel;

Figure 10 is a plan view of the arrangement of Figure 9;

Figure 11 is a plan view of the base of Figure 1 with a fourth framework channel;

Figure 12 is a perspective view of the base of Figure 1 with a fifth framework channel; and

Figure 13 is a plan view of the arrangement of Figure 12.

With reference to the figures, an embodiment of a modular framework support base 10 is shown having a generally planar foot 11 with a generally centrally positioned socket 12 extending upwardly therefrom. Socket 12 is generally of a rectangular cross-section having opposed longer walls 13 defining a long axis of the socket 12 and opposed shorter walls 14 defining a short axis. Reinforcing ribs 15 are provided between socket 12 and foot 11.

Suitably, the base is formed as a unitary element by injection moulding of a suitable plastics material, such as glass-filled nylon.

As illustrated most clearly in Figure 4, socket 12 has a projection 20 extending upwardly from a base of the socket. Projection 20 has a spine 21 aligned with the long axis of the
socket. Extending laterally from spine 21 are fingers 22,23 arranged in two pairs, each pair towards a respective short wall 14 of socket 12.

In the embodiment shown, fingers 22,23 are formed having a 90° bend. In alternative embodiments, not shown, fingers 22,23 are solid projections extending laterally from spine 21. Indeed, it will be appreciated that projection 20 can be moulded with a spine 21 having the required dimensions without the need for discrete fingers.

Short walls 14 are dimensioned to match the maximum width dimensions of Unistrut (41mm) and Eurostrut (40mm) respectively. It will be appreciated that embodiments of the present invention can be manufactured to fit any form of strut. Unistrut channels are formed to a wide range of designs, but typically conforming to two cross-sectional box sizes, 41mm x 41mm and 41mm x 21mm and are manufactured in several gauges, typically 12 gauge (2.66mm), 14 gauge (1.90mm) and 19 gauge (1.00mm).

Short wall 14 of socket 12 is suitably formed to have a dimension slightly larger than the 41mm dimension of the larger Unistrut channel 24 (Figure 5). Thereby, the large channel strut 24 can be inserted into socket 12 as shown in Figures 5 to 13. Figures 5 and 6 show the thicker gauge Unistrut channel and Figures 7 and 8 show the thinner gauge.

In accordance with a preferred feature of the present invention, long and short walls 13,14 of socket 12 are each provided with one or more vertical elongate ribs 25 extending into the socket. Ribs 25 advantageously include a stepped portion such that an operatively lower portion of each rib 25 extends further into socket 12 than does an upper portion. Ribs 25 act to hold channel 24 securely and the stepped portion allow the single socket design to hold both or all gauges of channel equally securely.

As illustrated, ribs 25 are suitably formed as opposed matching pairs 25', 25". Each pair corresponds with a particular choice of strut. For example, in the embodiment shown, as illustrated in Figure 4, the right hand side of socket 12 is intended for receipt of a 40mm Eurostrut channel whereas that on the left hand side is intended for receipt of a 41mm Unistrut channel. Accordingly, the ribs of rib pair 25" associated with the Eurostrut channel are formed to be 1mm larger than rib pair 25' associated with the larger Unistrut
channel. As can be seen in Figure 1, conveniently, the profiles of the appropriate strut channels can be moulded as icons into the base to indicate the correct positioning and orientation of the strut channel.

Figures 5 and 6 show the embodiment of the base with a large, heavy gauge Unistrut channel 24. Figures 7 and 8 show the same base with a lighter gauge Unistrut 30. Figures 9 and 10 show the base with the shorter (21mm) walled heavy gauge Unistrut 31 and Figure 11 shows the lighter gauge short walled Unistrut 32.

Figure 12 and 13 then show the same embodiment of the base with a standard Eurostrut channel 33.

It can be seen from a comparison of the plan views of the figures that fingers 22,23 are suitably dimensioned to correspond substantially to the spacing between the open edges of the strut channel which will, in use, be generally adjacent to the respective fingers 22,23. Although not essential for structural strength in an assembled framework construction, projection 20 and fingers 22,23 provide support and alignment to the strut during assembly of the framework.

It will therefore be appreciated that, in accordance with the present invention, a single base unit can be used with a range of strut channels of different dimensions without the need for a range of plastic inserts or other fillers to be kept in stock.
Claims

1. A support for a modular framework system, the support comprising a planar foot comprising a socket having a substantially rectangular cross-section with a long axis and a short axis, the socket having a base and an opening, wherein the socket is provided with one or more elongate ribs between the base and the opening and extending into the socket and wherein the socket further comprises a projection extending upwardly from the base, the projection having a spine aligned with the long axis of the socket.

2. A support as claimed in Claim 1 wherein each rib has a stepped configuration such that an operatively lower portion of the rib extends further into the socket than an operatively upper portion of the rib.

3. A support as claimed in Claim 1 or 2 wherein the spine includes at least one pair of fingers extending laterally therefrom, one finger on each side of the spine.
**INTERNATIONAL SEARCH REPORT**

**PCT/GB2013/052006**

**A. CLASSIFICATION OF SUBJECT MATTER**

INV. E04H12/22 F24F13/32 H01Q1/12

**ADD.**

According to International Patent Classification (IPC) into both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

E04H F24F A47G E01F F16M A47C E04G H01Q E04D E04F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, WPI Data

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

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Further documents are listed in the continuation of Box C. See patent family annex.

**Date of the actual completion of the international search**

26 November 2013

**Date of mailing of the international search report**

13/12/2013

**Name and mailing address of the ISA**

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Stefanescu, Radu
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