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(12) # EUROPEAN PATENT APPLICATION

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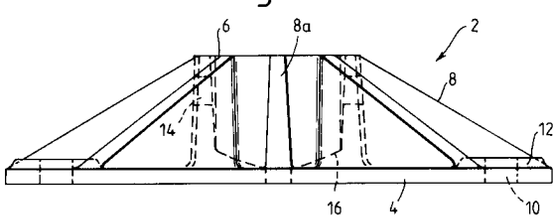
(54) **Improvements and relating to ground support members.**

(57) A ground support member for use with the vertical members of a scaffolding system is described. The member comprises a plate (4) and an upright socket member (6) attached thereto for receiving the lower end of a vertical support member. The plate (4) is rectangular and is formed by casting and/or has web members (8) which are connected between the socket member (6) and the plate (4).

Fig.1.



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This invention relates to support plates for use at the lower end of vertical members to transfer load thereon to the ground.

Ground support base plates are well known and are employed in numerous different situations. A particular example is in scaffolding systems comprising horizontally and vertically connected tubular members, known respectively as standards and ledgers, where base plates are provided at the lower end of the standards. If the surface upon which the scaffolding structure is constructed is rigid, for example, it is concreted, then the base plates rest directly thereon. If, on the other hand, no rigid base is provided, then timber slabs are set into the ground and the base plates rest on, and are generally connected to, the slabs. It is often desirable to provide a jack at the lower end of the vertical members. This allows their upper end to define a flat plane no matter what height variations there are in the supporting ground surface. In this case it is the jacks which are connected to the ground support base plates.

Known ground support base plates are square. The reason for this is that square plates are the most economical to manufacture. The plates are cut from sheets of metal.

Advances in recent years in the design of structural members and in the design of scaffolding systems have meant that much higher loads can be carried by the scaffolding. Base plates of known design are only capable of supporting such loads if they are made relatively thick. This adds to their expense and increases their self-weight. Furthermore with such high loads and with base plates of the known kind, there is a tendency, when the vertical members are carried on timber slabs, for the load transferred to the slabs to be greater than the strength of the slabs, with the result that the plates simply punch through the slabs so lowering the vertical members connected thereto.

It is an object of this invention to provide an improved base plate and, in particular, one which will perform satisfactorily with a vertical member subject to high loading.

A ground support member for use with a vertical structural member in accordance with the invention comprises a plate and a socket member connected to the plate by which the lower end of the vertical structural member is secured to the plate wherein the plate is rectangular and is formed by casting and/or web members are provided which are connected between the socket member and the plate.

The rectangular shape of the base plate allows higher loads to be supported since it gives better distribution of the loads onto the supporting surface than a square shaped plate, in particular, if the plate is carried on a timber slab with its major side parallel to the axis of the slab, higher loads can be carried per unit area of the plate without failure of the timber slab. Thus, for a given plate area, by making the plates rectangular instead of square, the range of loadings with which the plates can be employed is increased.

The provision of web members between the socket member and the plate has two effects. Firstly, the web members serve to support the central socket and so allow greater loads to be carried without risk of failure of the socket. Secondly, the web members serve to distribute loading on the ground support member from the vertical structural member evenly into the plate. This even distribution of the loading into the plate allows the thickness thereof to be less for a given load than would be necessary if the load was applied on one particular region of the plate without risk of failure.

Formation of the rectangular plate by casting in place of the known method of formation whereby the plate if cut from a sheet of metal, increases the strength of the plate. Thus, for a given load, the plate may be made thinner than would be necessary with known base plates.

The result of these features is illustrated by the fact that it has been found that, for the same safe working load to be supported, a ground support member with rectangular cast plate need have a thickness of, on average, 44% less than that of a known ground support member. Moreover, when web members were also provided, the necessary thickness was on average 58% less than that of the plate of the known ground support member.

Preferably the socket member is formed with holes so that the vertical structural member can be secured thereto by pinning through the holes. The socket may be separately formed from the plate and attached thereto, or it may be cast therewith. In a particularly preferred embodiment, the socket, webs and plate are all formed by casting and are integrally connected.

The web members are preferably evenly spaced around the socket. The plate may be provided with holes whereby it is connected to a timber slab on which it is to sit. The plate may be made thicker in the region of the holes. Two web members may be provided extending between the socket member and each hole, the webs being positioned on either side of each hole, the holes being suitably positioned in the corners of the plates. A further pair of web members may be provided lying on the minor axis of the plates.

By evenly spacing the web members, the loading on the support member is evenly distributed to the plates. Thickening the plate in the regions around the holes whereby it is connected to the ground support on which it is carried and/or providing web members which extend to the regions

ensures that the regions are strengthened sufficiently to compensate for the lost material due to the holes and ensures even loading despite the removal of the material to form the holes.

The socket member at its closed end may be provided with a concave curved surface. The ground support member is particularly suitable for use with a scaffolding system of the type comprising interconnected horizontal and vertical members and suitably the lower end of the vertical members, or, if provided, jacks attached thereto, are formed with a correspondingly shaped convex surface. The dimensions of the parts are arranged so that in use the two curved portions will mate. If the vertical structural member, or jack connected thereto, is pinned to the socket member then the pinning and mating surfaces will together allow for some play between the ground support member and vertical structural member. Suitably the arrangement is such that the plate can move 4° away from the horizontal whilst still being connected to the vertical structural member. This permits use of the ground support member with support surfaces which are not exactly horizontal without causing the vertical structural member to be pulled out of the vertical.

The invention will now be further described by way of example with reference to the accompanying drawings in which:-

Figure 1 is a view from the front of a ground support member in accordance with the invention; and

Figure 2 is a view from above of the ground support member of Figure 1.

The ground support member 2 comprises a plate 4 and a socket 6. The socket 6 is shaped to receive the lower end of a vertical structural member or the lower end of a jack connected to a vertical structural member to be carried on the ground support member 2. In the case were the ground support member 2 is to be employed with the type of known scaffolding system in which horizontal and vertical tubular members are connected together, the socket member 6 will be cylindrical as shown in the Figures.

The plate 4 is rectangular in shape. The rectangular plate 4 serves to spread loading applied thereto better than known square plates and accordingly for a given plate area, higher loads can be supported than with known ground support members.

The plate 4 is formed by casting. The plates of known ground support members are formed by cutting them out of a sheet of metal. Formation by casting results in a stronger plate which means that the plate 4 can be made thinner than known base plates for a given load to be supported.

The socket member 6 is preferably also formed by casting. The plate 4 and socket member 6 may be integrally formed or they may be separately formed and connected by welding.

A plurality of web members 8 are positioned round the socket member 6 and serve to connect these to the plate 4. The web members 8 serve two purposes. Firstly, they serve to support the socket member 6. Secondly, they serve to distribute loading on the member 2 into the plate 4, that is, they prevent the load from being applied solely to the region of the plate 4 directly below the socket member 6. As a result of this, for a given load, the plate 4 can be made thinner than if the web members 8 were not provided.

The plate 4 is provided with four holes 10 whereby it may be attached to a timber slab, the timber slab serving to carry the support member on unrigid ground. The thickness of the plate 4 is preferably increased, see 12, around the holes 10 and two web members 8 may extend from either side of each hole 10 to the socket member 6. This arrangement helps strengthen plate 4 in the region where the holes 10 have been cut and ensures an even distribution of the load despite these cutouts. Two further web members, identified in the Figures by 8a, may extend them along the minor axis of the plate 4 from the socket member 6 to the edges of the plate 4. The result of this configuration of the web members 8 is that they are all evenly spaced around the socket member 6 which ensures even distribution of loading on ground support member 2 to all parts of the plate 4.

The lower end of a vertical support member, or a jack connected thereto, is attached to the ground support member 2 by passing a pin through holes therein and through holes 14 in the socket member 6.

The closed end of the socket member 6 may be formed with a concave curved surface 16. The lower end of the vertical structural member, or jack connected thereto, which is to be carried by the ground support member 2 is preferably formed with a correspondingly convex curved surface. The dimensions of the parts are arranged so that, in use, the two curved surfaces mate. As a result of this, and the fact that the vertical structural member is pinned to the socket member 6, that is, it is not rigidly connected thereto, the plate 4 has a certain amount of play relative to the vertical structural member. With a curved surface 16 as shown in the Figures, the play is such that the plate 4 can move about 4° horizontal orientation. This feature allows the ground support member to be employed with a support surface which is not absolutely horizontal without pulling the vertical structural member out of the vertical.

The support member 2 is much stronger than known support members and, therefore, is capable of withstanding much higher loads. Furthermore, it

can be used with timber slabs at much higher loads without risk of failure of the timber slabs. The plate can be made relatively thin, much thinner than will be necessary with known plates for a given load. It can be used with an uneven ground surface without pulling a structural member that is connected is thereto out of the vertical.

Although the ground support member has been described as having a socket member in which the lower end of the vertical support member is received, it will be appreciated that, in particular, in the case of tubular support members, the socket member could be dimensioned so that it is received within the lower end of the support member. In this case, the socket member need not be hollow but may instead be a solid pin.

Claims

1. A ground support member for use with a vertical structural member comprising a plate and a socket member connected to the plate by which the lower end of the vertical structural member is secured to the plate characterised in that the plate (4) is rectangular and a plurality of web members (8) are provided connected between the socket member (6) and the plate (4).

2. A ground support member for use with a vertical structural member comprising a plate and a socket member connected to the plate by which the lower end of the vertical structural member is secured to the plate characterised in that the plate (4) is rectangular and is formed by casting.

3. A ground support member as claimed in Claim 2 wherein the plate (4) is formed by casting.

4. A ground support member as claimed in either Claim 1 or Claim 3 wherein the web members (8) are integrally formed with the plate (4).

5. A ground support member as claimed in any one of Claims 1, 3 or 4 wherein the web members (8) are evenly spaced around the socket member (6).

6. A ground support member as claimed in any one of Claims 1, 3, 5 or 6 wherein two web members (8a) extend from the socket member (6) on either side thereof along the minor axis of the plate (4).

7. A ground support member as claimed in any preceding Claim wherein the plate (4) is formed with holes (10) whereby it may be pinned to a support slab interposed between it and the ground.

8. A ground support member as claimed in Claim 7 when dependent on any one of Claims 1, or 3 to 6, wherein a pair of web members (8) extends from the socket member (6) to each hole (10).

9. A ground support member as claimed in either Claim 7 or Claim 8 wherein the regions (12) of the plate (4) adjacent the holes (10) are thicker than the remainder thereof.

10. A ground support member as claimed in any preceding Claim wherein the socket member (6) is integrally formed with the plate (4).

11. A scaffolding system comprising interconnected vertical and horizontal structural members and ground support members for the vertical members as claimed in any one of Claims 1 to 10.

12. A scaffolding system as claimed in Claim 11 wherein the socket member (6) has a concave curved surface (16) against which the lower end of the associated vertical structural member, or of a jack connected thereto, abuts, the lower end having a correspondingly curved convex mating surface.

Fig. 1.

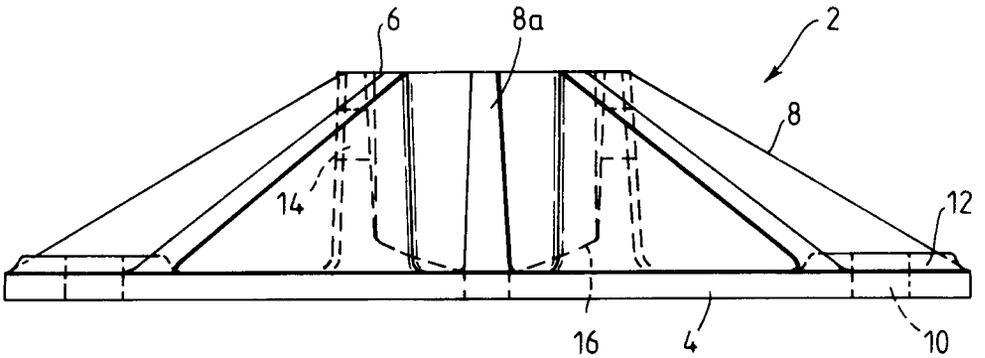
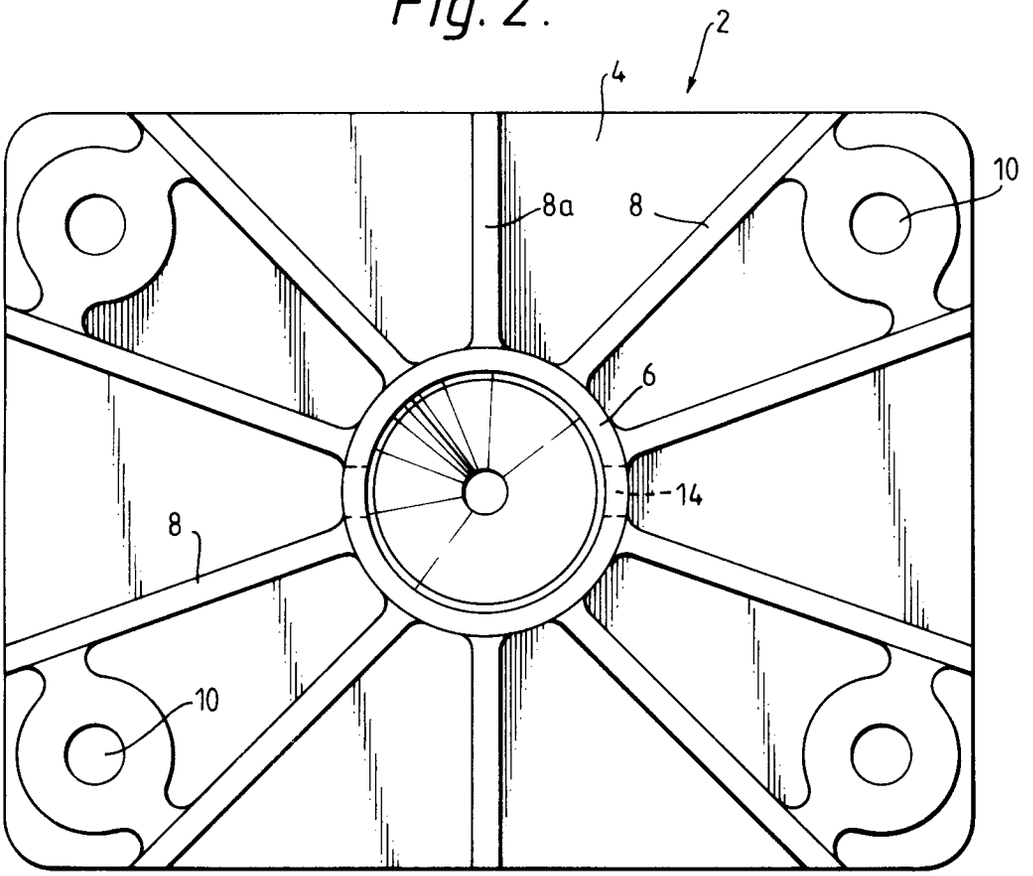


Fig. 2.



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EUROPEAN SEARCH REPORT

Application Number

EP 91 30 8983

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X	FR-A-714 781 (LARCENEUX) * page 1, line 48 - page 2, line 9; figures * *	1-5,7-11	E 04 G 5/02 E 04 G 25/00
X	DE-A-1 903 691 (L. & C. STEINMÜLLER) * the whole document * *	1,3-5,10	
X	GB-A-983 057 (BETONBAU) * page 3, line 76 - line 97; figure 5 * *	1,12	
A	GB-A-988 270 (SQUIRE)		

TECHNICAL FIELDS SEARCHED (Int. Cl.5)
E 04 G

The present search report has been drawn up for all claims

Place of search	Date of completion of search	Examiner
The Hague	17 January 92	VIJVERMAN W.C.

CATEGORY OF CITED DOCUMENTS

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