Title: GROUND STABILISING ARRANGEMENT

(57) Abstract: A ground stabilising arrangement (10) comprises a load spreading member (12) defining an aperture (16), and a securing device (14) comprising a body (18) for insertion into the ground, and an engaging portion (20) extending outwardly from the body. The body is receivable through the aperture in the load spreading member so that the engaging portion can engage the load spreading member. The body (18) defines a through passage (22) for an elongate article (24). The securing device further includes a clamping member (30) and urging means (32) for urging the clamping member towards the through passage into clamping engagement with the elongate article.
Ground Stabilising Arrangement

This invention relates to ground stabilising arrangements. Embodiments of this invention relate to ground stabilising arrangements operable by clamping an elongate article.

Ground stabilising arrangements are known, and different types are provided for different ground conditions. This requires maintaining stock of all the different types to ensure that any ground condition can be accommodated. Known ground stabilising arrangements can also cause the problem that any misalignment can result in the ground not being fully stabilised.

According to one aspect of this invention, there is provided a ground stabilising arrangement comprising: a load spreading member defining an aperture; a securing device comprising a body for insertion into the ground, and an engaging portion extending outwardly from the body, the body being receivable through the aperture in the load spreading member so that the engaging portion can engage the load spreading member, and the body defining a through passage for an elongate article; wherein the securing device further includes a clamping member and urging means for urging the clamping member towards the through passage into clamping engagement with the elongate article.

The aperture defined by the load spreading member may be circular or any other suitable shape, such as rectangular. The aperture may be defined centrally in the load spreading member. The load spreading member may be substantially flat. The load spreading member may comprise a dome. The load spreading member may define a recess.

The body may have a guide formation to guide the clamping member towards the through passage. The guide formation may comprise a guide wall. The guide formation may comprise an internal guide wall.
The body may have a clamping formation, which may define the through passage. The clamping formation may extend along the through passage. The clamping member may be arranged to clamp the elongate article against the clamping formation.

The clamping formation may comprise a clamping wall. The clamping formation may comprise an internal clamping wall. The guide formation and the clamping formation may taper towards each other.

The engaging portion may extend transverse to the body. The engaging portion may comprise a flange, which may be substantially rectangular or substantially circular. The engaging portion may surround the body.

The engaging portion may have a chamfered peripheral face. The chamfered peripheral face may be an upper face. The engaging portion may have lower gripping teeth for gripping the load spreading member. The engaging portion may include a lower face. The gripping teeth may be provided on the lower face.

The body may have proximal and distal end regions. The engaging portion may be provided at the proximal end region of the body. When the body is inserted into the ground, the distal end region may be inserted first.

The urging means may urge the clamping member away from the proximal end region towards the distal end region. The clamping member may be disposed between the proximal and distal end regions of the body. The urging means may be disposed between the clamping member and the proximal end region of the body.

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

Figure 1 is a top perspective view of a ground stabilising arrangement;
Figure 2 is a bottom perspective view of the ground stabilising arrangement shown in Figure 1; and

Figure 3 is a sectional side view of the ground stabilising arrangement shown in Figures 1 and 2.

Referring to Figures 1 and 2, there is shown a ground stabilising arrangement 10, which comprises a substantially circular load spreading member 12 and a securing device 14. The load spreading member 12 is substantially flat and defines a central substantially circular aperture 16 (see Figures 2 and 3).

The securing device comprises a body 18 which is disposed through the central aperture 16, and a rectangular engaging portion 20 which surrounds the body 18 and extends outwardly from the body 18. The engaging portion 20 engages the load spreading member 12 when the body 18 is disposed through the aperture 16.

The engaging portion 20 has a chamfered peripheral upper face 20A and a lower face 20B. A plurality of lower gripping teeth 21 extend from the lower face 20B.

A sectional side view of the securing device 14 is shown in Figure 3, in which only a central region of the load spreading member 12 is shown. The body 18 defines a through passage 22 for an elongate article 24 (also shown in broken lines.) The elongate article extends through the passage 22. The elongate article 24 is in the form of a wire, wire strand or other suitable elongate article.

The body 18 has a proximal end region 18A adjacent the engaging portion 20 and a distal end region 18B at the opposite end of the body 18. The body 18 defines a clamping formation in the form of an internal clamping wall 26 and a guide formation in the form of an internal guide wall 28.

The securing device 14 further includes a clamping member 30 and urging means in the form of a coiled compression spring 32. In the embodiment shown, the clamping member 30 is in the form of a sphere, but it will be appreciated by those skilled in the
art that the clamping member 30 could be any other suitable shape, such as cylindrical or wedge shaped.

A reaction member 34 extends part way across the passage 22 at the proximal end region 18A, and provides a reaction to the spring 32, thereby urging the clamping member 30 in the direction indicated by the arrow X along the guide wall 28. This urges the clamping member 30 into engagement with the elongate article 24 and, as a result, the elongate article 24 is clamped against the clamping wall 26 by the clamping member 30.

As can be seen from Figure 3, the clamping member 30 is disposed between the proximal end region 18A and the distal end region 18B of the body 18, and the spring 32 is disposed between the clamping member 30 and the proximal end region 18A.

In use, a ground anchor (not shown) of the type that would be known to those skilled in the art is first driven into the ground. The ground anchor has attached thereto the elongate article 24, which is of sufficient length to extend from the ground anchor to the surface of the ground. In Figure 3, the surface of the ground is generally designated 100, and is represented by a broken line.

The elongate article 24 is threaded through the passage 22 in the body 18 in the direction indicated by the arrow A in Figure 3, which pushes the clamping member 30 against the action of the spring 32 away from the clamping wall 26. Prior to the elongate article 24 being threaded through the passage 22, the securing device 14 is first arranged so that the body 18 is disposed through the aperture 16 in the load spreading member 12, and the engaging portion 20 engages the load spreading member 12.

Alternatively, the ground stabilising arrangement 10 may be supplied with the elongate article 24 previously threaded through the passage 22 in the securing device 14. In this alternative, the ground stabilising arrangement 10 may be supplied with a pre-selected load spreading member 12 arranged on the securing device 14.
The securing device 14 is then threaded along the elongate article 24 until the load spreading member 12 is in engagement with the surface 100 of the ground, as shown in Figure 3. The elongate article 24 can then be pulled through the body 18 in the direction indicated by the arrow A until the elongate article is tight.

The clamping of the elongate article 24 occurs as a result of the spring 32 urging the clamping member 30 along the guide wall 28 into engagement with the elongate article 24 and with the guide wall 28. Any movement of the securing device 14 relative to the elongate article 24 in the direction indicated by the arrow B tightens the clamping member 30 between the guide wall 28 and the elongate article 24, thereby clamping the elongate article 24 tighter against the clamping wall 26.

It is desirable for the ground stabilising arrangement 10 to press downwardly on the ground under the force applied by the elongate article 24. This can be accomplished by the user pushing downwardly on the securing device 14 while pulling up tightly on the elongate article 24. This slightly compresses the ground and, when the downward force on the securing device 14 is removed, the compressed ground relaxes. The relaxation of the ground pushes upwardly on the ground stabilising arrangement 10, thereby causing the clamping member 30 to be engaged tightly between the guide wall 28 and the elongate article 24, and clamping the elongate article 24 tightly against the clamping wall 26.

The provision of the separate load spreading member 12 and securing device 10 provides the advantage in the embodiment described herein that the load spreading member 12 can be made from a material suitable for its purpose, and the body 18 and engaging portion 20 of the securing device can be made from a different material, suitable for the purpose of the securing device.

The above described embodiment of the ground stabilising arrangement provides the advantage that it allows the use of different materials for the respective components. As a result, the properties of each component can be configured for its purpose, e.g. the material for the load spreading member 12 can be a low reflectivity
material with a high bending strength. The material for the securing device 14 can be selected so that it has a high tensile strength and manufacturing accuracy.

A further advantage of the above described embodiment is that it allows the user to select the appropriate size of the load spreading member 12 on site. This reduces costs, in that the securing device 14 need only be made of a single size, whereas the less expensive load spreading member 12 can be made in different sizes.

Another advantage of the above described embodiment is that transportation as separate load spreading members 12 and securing devices 14 saves space, thereby reducing the cost and environmental impact of transportation.

Yet another advantage of the above described embodiment is that a separate load spreading member 12 and securing device 14 corrects any misalignment between the elongate article 24 and the ground surface, thereby ensuring that the load spreading member 14 lies flat.

Various modifications can be made without departing from the scope of the invention. For example, the engaging portion 20 could be circular, or any other suitable shape, instead of rectangular. Also the load spreading member could be a suitable shape other than circular.

In a further modification, the load spreading member 12 may be domed or recessed.
Claims

1. A ground stabilising arrangement comprising: a load spreading member defining an aperture; a securing device comprising a body for insertion into the ground, and an engaging portion extending outwardly from the body, the body being receivable through the aperture in the load spreading member so that the engaging portion can engage the load spreading member, and the body defining a through passage for an elongate article; wherein the securing device further includes a clamping member and urging means for urging the clamping member towards the through passage into clamping engagement with the elongate article.

2. A ground stabilising arrangement according to claim 1, wherein the aperture defined by the load spreading member is circular.

3. A ground stabilising arrangement according to claim 1, wherein the aperture defined by the load spreading member is rectangular.

4. A ground stabilising arrangement according to claim 1, 2 or 3, wherein the aperture is defined centrally in the load spreading member.

5. A ground stabilising arrangement according to any preceding claim, wherein the load spreading member is substantially flat.

6. A ground stabilising arrangement according to any preceding claim, wherein the load spreading member comprises a dome.

7. A ground stabilising arrangement according to any preceding claim, wherein the load spreading member defines a recess.

8. A ground stabilising arrangement according to any preceding claim, wherein the engaging portion extends transverse to the body.

9. A ground stabilising arrangement according to any preceding claim, wherein the engaging portion comprises a flange, which is substantially rectangular or substantially circular.
10. A ground stabilising arrangement according to any preceding claim, wherein the engaging portion surrounds the body.

11. A ground stabilising arrangement according to any preceding claim, wherein the engaging portion has a chamfered peripheral upper face.

12. A ground stabilising arrangement according to any preceding claim, wherein the engaging portion has lower gripping teeth for gripping the load spreading member.

13. A ground stabilising arrangement according to claim 12, wherein the engaging portion includes a lower face, the gripping teeth being provided on the lower face.

14. A ground stabilising arrangement according to any preceding claim, wherein the body has a guide formation to guide the clamping member towards the through passage.

15. A ground stabilising arrangement according to claim 14, wherein the guide formation comprises an internal guide wall.

16. A ground stabilising arrangement according to any preceding claim, wherein the body has a clamping formation.

17. A ground stabilising arrangement according to claim 16, wherein the clamping formation defines the through passage.

18. A ground stabilising arrangement according to claim 16 or 17, wherein the clamping formation extends along the through passage, and the clamping member is arranged to clamp the elongate article against the clamping formation.

19. A ground stabilising arrangement according to claim 16, 17 or 18, wherein the clamping formation comprises an internal clamping wall, and wherein the guide formation and the clamping formation taper towards each other.

20. A ground stabilising arrangement according to any preceding claim, wherein the body has proximal and distal end regions, the engaging portion being provided at
the proximal end region of the body, whereby when the body is inserted into the
ground, the distal end region is so inserted first.

21. A ground stabilising arrangement according to claim 20, wherein the clamping
member is disposed between the proximal and distal end regions of the body, and
the urging means is disposed between the clamping member and the proximal end
region of the body, whereby the urging means urges the clamping member away
from the proximal end region towards the distal end region.

22. A ground stabilising arrangement according to any preceding claim, wherein
the clamping member comprises a wedge, a sphere or a cylinder

23. A ground stabilising arrangement substantially as herein described with
reference to the accompanying drawings.
Fig. 1
INTERNATIONAL SEARCH REPORT

International application No
PCT/GB2014/000188

A. CLASSIFICATION OF SUBJECT MATTER
INV. F16G11/10
ADD.

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
F16G

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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<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
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<td>GB 2 490 013 A (GRI PPLE LTD [GB] ) 17 October 2012 (2012-10-17) the whole document</td>
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Further documents are listed in the continuation of Box C. [X] See patent family annex.

* Special categories of cited documents :
  * A* document defining the general state of the art which is not considered to be of particular relevance
  * E* earlier application or patent but published on or after the international filing date
  * L* document which may throw doubts on priority claim(s) one of which is cited to establish the publication date of another citation or other special reason (as specified)
  * O* document referring to an oral disclosure, use, exhibition or other means
  * P* document published prior to the international filing date but later than the priority date claimed
  * T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
  * X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
  * Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
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Date of the actual completion of the international search 21 October 2014

Date of mailing of the international search report 10/11/2014

Name and mailing address of the ISA/
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Authorized officer
Geiger, Harald
This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. □ Claims Nos.: because they relate to subject matter not required to be searched by this Authority, namely:

2. ☒ Claims Nos.: because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
   - see FURTHER INFORMATION sheet PCT/ISA/210

3. □ Claims Nos.: because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

This International Searching Authority found multiple inventions in this international application, as follows:

1. □ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. □ As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.

3. □ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.: 

4. □ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.: 

Remark on Protest
- □ The additional search fees were accompanied by the applicant’s protest and, where applicable, the payment of a protest fee.
- □ The additional search fees were accompanied by the applicant’s protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- □ No protest accompanied the payment of additional search fees.
Claims Nos.: 23

Instead of clearly indicating the subject matter of the claim by technical features, there is only a reference to the drawings. Hence, the claim 23 was not sufficiently clear, and a search could not be conducted for this claim.

The applicant's attention is drawn to the fact that claims relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on a matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure. If the applicant proceeds into the regional phase before the EPO, the applicant is reminded that a search may be carried out during examination before the EPO (see EPO Guidelines C-IV, 7.2), should the problems which led to the Article 17(2) declaration be overcome.
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