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(54) Title: CULTIVATION SYSTEM

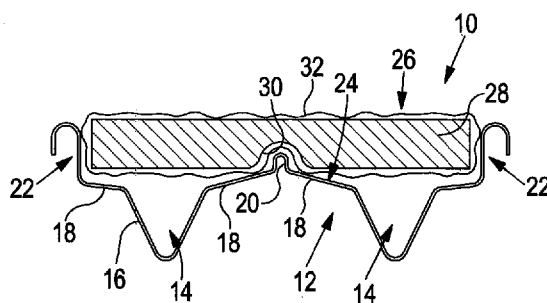


Figure 1

(57) Abstract: A cultivation system is described that comprises an elongate support member (12), the support member (12) being provided with a longitudinal feature (20), and a growing medium (26) carried by the support member (12), the growing medium (26) defining a cooperating longitudinal feature (30) with which the longitudinal feature (20) of the support member (12) interengages.



CULTIVATION SYSTEM

This invention relates to a crop cultivation system, for example for use within polytunnels, glasshouses or other covered areas.

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It is becoming increasingly common for crops to be grown under cover, for example in polytunnel structures or the like, in order to provide protection for the crops, and to allow control or optimisation of the temperature, humidity or other conditions in which the crops are grown to maximise yield, and reduce the risk of insect damage or the like.

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It is also common for crops to be grown in growing medium containing bags or containers. Accordingly, the characteristics of the growing medium can be selected to suit the crop being cultivated. Where grown in growing medium containing bags or the like, it is known for the bags or the like to be supported upon a table or the like. As a result, the height of the crops above ground can be selected for ease of management and harvesting, and to avoid produce becoming damaged through contact with the ground. The table or the like may be designed in such a manner as to aid irrigation and drainage of the growing medium and crops growing therein.

20 In use, the weight of the growing medium, especially when wet, can be significant. The supporting tables or the like need to be capable of providing good support for the growing medium, bearings the loads that are applied thereto in use. It is an object of the invention to provide an improved cultivation system.

25 According to the present invention there is provided a cultivation system comprising an elongate support member, the support member being provided with a longitudinal feature, and a growing medium carried by the support member, the growing medium and/or a container associated therewith defining a cooperating longitudinal feature with which the longitudinal feature of the support member interengages.

The longitudinal feature of the support member conveniently takes the form of a longitudinal rib, the cooperating feature of or associated with the growing medium taking the form of a channel within which the longitudinal rib is received, in use. Alternatively, the support member may include a longitudinal channel, the growing medium including a longitudinal rib. In such an arrangement the growing medium may be of mushroom shaped cross-sectional shape.

Such an arrangement is advantageous in that the longitudinal rib or groove or other feature serves to enhance the stiffness of the support member, and the location of the feature with the corresponding feature of the growing medium serves to resist lateral movement of the growing medium, assisting in ensuring that the growing medium is retained in a desired lateral position relative to the support member. By enhancing the stiffness of the support member, it will be appreciated that it may be possible for the support member to be fabricated using thinner, lighter weight materials, and that it may be possible to increase the spacing of support legs or the like whilst still providing adequate support. As a result, manufacturing costs may be reduced.

The growing medium may take the form of a block of a growing material such as peat, soil, coir or the like, located within a plastics or the like material bag, the block being preformed to define the channel. Alternatively, the growing medium may take the form of a pair of blocks of a growing material located side-by-side within a plastics or the like material bag, the blocks being spaced apart from one another to define the channel. In a further alternative, the growing medium may comprise a growing material located within a rigid tray or trough shaped to define the channel. Further, as mentioned above, the growing medium may include a rib and may be of generally mushroom shaped cross sectional shape. The growing medium need not be contained within a bag.

The invention further relates to a support member adapted for use in the cultivation system described hereinbefore, and to a growing medium adapted for use in the cultivation system described hereinbefore.

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

Figure 1 is a diagrammatic representation of a cultivation system in accordance with an embodiment of the invention;

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Figures 2 and 3 are views similar to Figure 1 illustrating alternative embodiments; and Figure 4 illustrates another possibility.

Referring firstly to Figure 1, a cultivation system 10 in accordance with an embodiment of the invention is illustrated. The cultivation system 10 comprises a metallic material support member 12, for example formed by the rolling of an elongate steel or the like material sheet to adopt the section shown. The support member 12 defines a pair of generally V-shaped drainage channels 14, each of which includes a relatively steeply sloped central part 16, and a more shallowly sloped upper part 18. At the point at which the upper parts 18 of the two channels 14 join one another, an elongate rib 20 is formed, the rib 20 extending longitudinally of the support member 12. The outer edges of the upper parts 18 each adjoin a respective side wall 22. The upper edges of the side walls 22 are rolled or curved to avoid the formation of sharp edges or the like which could form a hazard to individuals working with the system 10, for example involved with the harvesting of fruit or the like.

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Whilst cold rolled steel represents one suitable material and manufacturing method by which the support member 12 may be fabricated, it will be appreciated that the invention is not restricted in this regard, and other materials and methods of fabrication may be used.

By way of example, the support member 12 could be of moulded plastics material form if desired.

The relatively gently sloping upper parts 18 of the channels 14 serve to define a support
5 surface 24 upon which a growing medium 26 rests.

As shown in Figure 1, the growing medium 26 takes the form of a preformed block 28 of a suitable growing material such as coir, peat, soil or the like. The growing material may further include other materials such as sand to enhance drainage, materials to absorb and
10 slowly release water, and fertiliser products to promote growth of crops. The characteristics of the growing material may be selected depending upon the crop to be grown to optimise growth of the crop.

The block 28 is preformed with an elongate channel 30 that extends longitudinally of the
15 block 28, the channel 30 being formed in the centre of the lower face of the block 28. The block 28, in the arrangement shown in Figure 1, is located within a flexible plastics material bag 32 or the like. However, the location of the block 28 within a bag 32 or other container need not always be the case and arrangements in which no bag 32 is provided are also possible within the scope of the invention. The channel 30 is of dimensions to allow it to
20 receive the rib 20, when the growing medium 26 is located upon the support member 12, resting upon the support surface 24 thereof.

In use, the support member 12 is supported, for example upon legs or the like (not shown) so as to extend generally horizontally. The legs may be of a fixed length and arranged to
25 support the support member 12 at a substantially fixed height above the underlying ground surface. Alternatively, they may be of adjustable form, for example being of a telescopic form, to allow the support member 12 to be supported at a range of heights above the ground surface. By way of example, the support member 12 may be supported at a relatively low level during cold weather, the retained heat within the ground aiding in
30 maintaining the substrate and surrounding air at a desired growing temperature, thereby

aiding the production of early fruit yields or the like. In summer, when crops are to be harvested, the support member 12 may be raised by appropriate adjustment of the legs to aid harvesting or picking. Raising and/or lowering may also or alternatively be undertaken for other reasons. The growing medium 26 is positioned upon the support member 12 with the rib 20 located within the channel 30. It will be appreciated that the location of the rib 20 within the channel 30 serves to ensure that the growing medium 26 is held centrally within the trough or channel defined by the support member 12, resisting lateral movement thereof. The rib 20 further serves to enhance the stiffness of the support member 12, reducing the likelihood of significant deflection thereof under the loads applied thereto in use.

The growing medium 26 is supplied in a dehydrated, solid form. Once positioned upon the support member 12, water is added thereto. The addition of the water to the growing medium 26 typically results in expansion of the growing material. If not correctly positioned, this expansion can result in the growing medium 26 being positioned off-centre which may lead to instability of the support member 12, or may result in the growing medium 26 overhanging from the support member 12, potentially impeding access between adjacent support members 12. By ensuring that the growing medium 26 is correctly located by the use of the present invention, the risk of the disadvantages associated with such mis-location of the growing medium 26 occurring is reduced.

A number of growing medium units are located upon the support member 12 in an end-to-end fashion. Once located in this fashion, and after the addition of water thereto as mentioned above, crops can be planted into the growing material.

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A suitable irrigation system (not shown) can be used to supply water to the growing material and to the crops growing therein, in use. Excess water can drain from the growing medium 26 into the channels 14, flowing along the central parts 16 thereof to a remote location.

Whilst in the arrangement described hereinbefore the support member 12 is provided with a longitudinal feature in the form of a rib 20, it will be appreciated that instead a longitudinal channel could be provided therein, the channel being arranged to receive a longitudinal rib provided on the growing medium. In such an arrangement, the block 28 may be of generally mushroom shaped cross sectional shape as illustrated in Figure 4, including a projecting rib 28a of the block 28 received, in use, within a channel defined by the support member 12.

Figure 2 illustrates a modification to the arrangement described hereinbefore in which the growing medium 26 takes the form of a rigid trough or tray 40 formed with a channel 42 to receive the rib 20, the trough or tray 40 containing the growing material.

Figure 3 illustrates another variant of the arrangement shown in Figure 1, in which the channel 50 is defined between a pair of blocks 28 of growing material. Figure 3 further illustrates the use of a support member 12 including generally U-shaped channels 52, instead of generally V-shaped channels 14.

It will be appreciated that, like the arrangements of Figures 1 and 4, the arrangements of Figures 2 and 3 are advantageous in that the support member is of enhanced longitudinal stiffness, and that the growing medium is positively retained in a desired central position on the support member.

Whilst specific embodiments of the invention have been described hereinbefore, it will be appreciated that a wide range of modifications and alterations may be made to the arrangements described and illustrated without departing from the scope of the invention as defined by the appended claims.

CLAIMS:

1. A cultivation system comprising an elongate support member, the support member being provided with a longitudinal feature, and a growing medium carried by the support
5 member, the growing medium defining a cooperating longitudinal feature with which the longitudinal feature of the support member interengages.
2. A system according to Claim 1, wherein the longitudinal feature of the support member takes the form of a longitudinal rib, the cooperating feature of the growing medium
10 taking the form of a channel within which the longitudinal rib is received, in use.
3. A system according to Claim 1, wherein the longitudinal feature of the support member takes the form of a longitudinal channel, the cooperating feature of the growing medium taking the form of a rib received, in use, within the longitudinal channel.
15
4. A system according to Claim 3, wherein the growing medium is of generally mushroom shaped cross sectional shape.
5. A system according to any of the preceding claims, wherein the growing medium
20 takes the form of a block of a growing material, located within a plastics or the like material bag, the block being preformed to define the cooperating feature.
6. A system according to any of Claims 1 to 4, wherein the growing medium takes the form of a pair of blocks of a growing material located side-by-side within a plastics or the
25 like material bag, the blocks being spaced apart from one another to define the cooperating feature.

7. A system according to any of Claims 1 to 4, wherein the growing medium comprises a growing material located within a rigid tray or trough shaped to define the cooperating feature.

5 8. A system according to any of the preceding claims, wherein the growing material comprises coir, peat, soil or the like.

9. A system according to any of the preceding claims, wherein the support member is supported upon a plurality of legs.

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10. A system according to Claim 9, wherein the legs are of an adjustable form to allow the support member to be supported at a range of heights above the ground.

11. A system according to Claim 10, wherein the legs are of a telescopic form.

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12. A support member adapted for use in the cultivation system of any of the preceding claims, the support member being provided with a longitudinal feature adapted to cooperate with a cooperating longitudinal feature of a growing medium supported upon the support member, in use.

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13. A growing medium adapted for use in the cultivation system of any of Claims 1 to 11, the growing medium defining a longitudinal feature cooperating, in use, with a longitudinal feature provided upon a support member upon which the growing medium is supported, in use.

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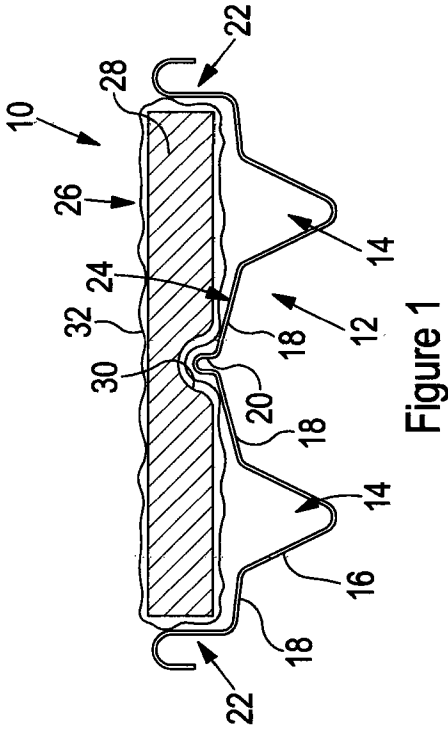


Figure 1

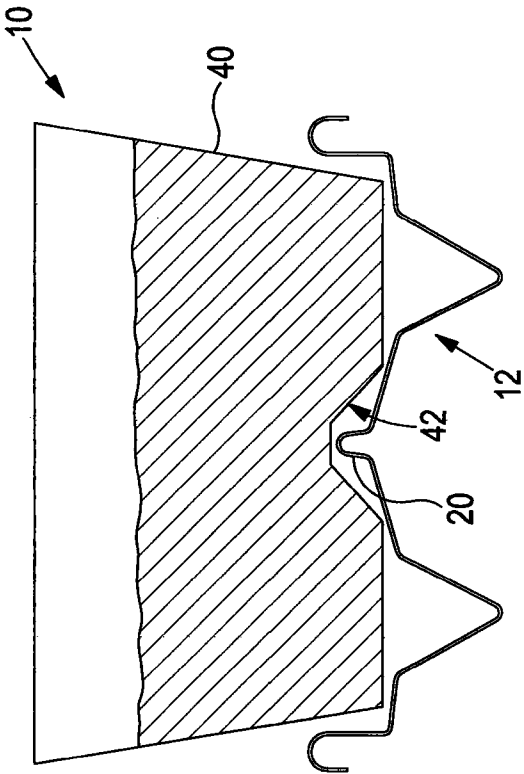


Figure 2

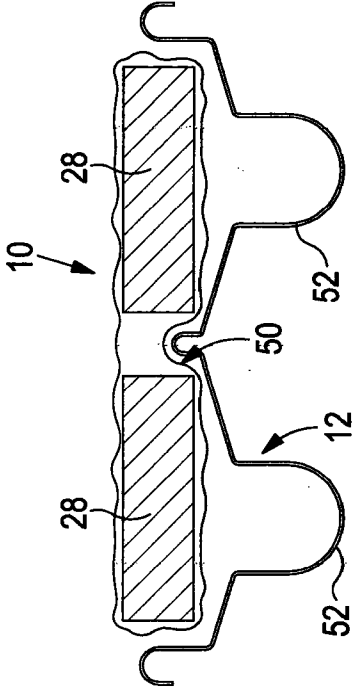


Figure 3

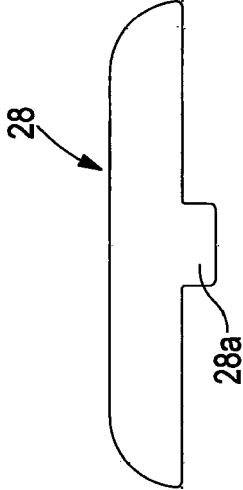


Figure 4

INTERNATIONAL SEARCH REPORT

International application No
PCT/GB2018/050581

A. CLASSIFICATION OF SUBJECT MATTER
INV. A01G24/50 A01G9/033
ADD.

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
A01G

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

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB 2 230 170 A (IRVINE ROBERT) 17 October 1990 (1990-10-17)	1-3,7-13
Y	page 2, paragraph 4 - page 6; figures -----	4-6
X	EP 0 764 400 A1 (MIKADO CHEMICAL M F G CO [JP]) 26 March 1997 (1997-03-26)	1-3
Y	column 3, line 19 - column 6, line 6; figure 11 -----	4
Y	WO 02/19802 A1 (TECH ETANCHEITE CT [FR]; DENIAU FRANCIS [FR]) 14 March 2002 (2002-03-14)	5
A	page 9, line 30 - page 11, line 11; figure 5 -----	1-4,6-13
Y	WO 87/03168 A1 (BEGHIN SAY SA [FR]) 4 June 1987 (1987-06-04)	6
A	page 9, line 1 - page 9; figures 7-8 -----	1-5,7-13
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Further documents are listed in the continuation of Box C.



See patent family annex.

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"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

"&" document member of the same patent family

Date of the actual completion of the international search

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INTERNATIONAL SEARCH REPORT

International application No

PCT/GB2018/050581

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4 299 056 A (TOWNING DENNIS J) 10 November 1981 (1981-11-10) claims; figures -----	1-13

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/GB2018/050581

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
GB 2230170	A	17-10-1990	NONE
EP 0764400	A1	26-03-1997	CN 1151243 A 11-06-1997
			EP 0764400 A1 26-03-1997
			JP 3051345 B2 12-06-2000
			JP H09140255 A 03-06-1997
			US 5761847 A 09-06-1998
WO 0219802	A1	14-03-2002	AT 400994 T 15-08-2008
			AU 8783401 A 22-03-2002
			EP 1331843 A1 06-08-2003
			FR 2813750 A1 15-03-2002
			WO 0219802 A1 14-03-2002
WO 8703168	A1	04-06-1987	AU 598783 B2 05-07-1990
			CA 1320640 C 27-07-1993
			DE 3674762 D1 08-11-1990
			EP 0230799 A1 05-08-1987
			ES 2017637 B3 01-03-1991
			FR 2590761 A1 05-06-1987
			GR 3001106 T3 12-05-1992
			JP S63501768 A 21-07-1988
			PT 83833 A 01-12-1986
			US 5081791 A 21-01-1992
			WO 8703168 A1 04-06-1987
US 4299056	A	10-11-1981	NONE