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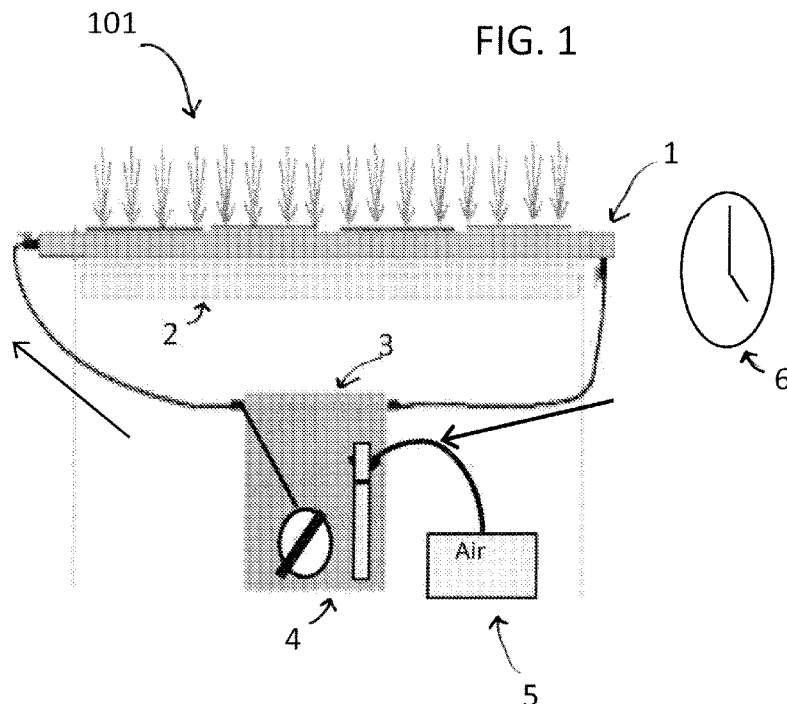
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[Continued on next page]

(54) Title: HYDROPONIC APPARATUS AND METHODS OF USE



(57) Abstract: Hydroponic apparatus and methods for the high-throughput screening plants are disclosed. In one aspect, a method for the high-throughput screening of plants is disclosed. The method comprises germinating a plurality of plants in a hydroponic apparatus; selecting one or more plants having substantially uniform qualities from the plurality of germinated plants to form a population of plants; growing the population of selected plants in a controlled environment; and screening one or more plants in the population at least once during a growing period to determine the presence or absence of one or more predetermined characteristics.



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ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV,
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ML, MR, NE, SN, TD, TG).

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INTERNATIONAL SEARCH REPORT

International application No
PCT/US2010/025568A. CLASSIFICATION OF SUBJECT MATTER
INV. A01G7/00 A01G31/00 A01G31/02

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 practical, 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.
Y	EP 0 615 684 A1 (YANOHARA YOSHITAMI [JP]) 21 September 1994 (1994-09-21) column 6, line 11 - column 14, line 47; figures	1-8
Y	EP 1 820 391 A1 (CROPDESIGN NV [BE]) 22 August 2007 (2007-08-22) paragraph [0021] - paragraph [0023]; figures	1-8
A	DE 202 01 033 U1 (FORMFLEX HORTI SYSTEMS V O F [NL]) 8 August 2002 (2002-08-08) page 2; figures	1-8
A	US 4 908 985 A (DOWELL MICHAEL S [US]) 20 March 1990 (1990-03-20) column 2, line 58 - column 5, line 2; figures	1-8
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 Further documents are listed in the continuation of Box C. 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 document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or 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.

"&" document member of the same patent family

Date of the actual completion of the international search

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30/08/2010

Name and mailing address of the ISA/

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INTERNATIONAL SEARCH REPORT

International application No
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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 90/10273 A1 (MASSEN ROBERT [DE]) 7 September 1990 (1990-09-07) claims; figures -----	1-8

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2010/025568

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

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:

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).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

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

see additional sheet

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.:

1-8

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.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-8

A system for high-throughput screening of plants comprising, a hydroponics subsystem with first and second trays, a reservoir, effluent drains, and an oxygenation source; and an imaging subsystem adapted to receive the first tray

2. claims: 9-18

A method of screening plants comprising the steps of germinating a plurality of plants in a hydroponic apparatus, selection of plants, growing the selected population, and screening the population.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2010/025568

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 0615684	A1	21-09-1994	AU 5774094 A CA 2119043 A1 NO 940918 A	22-09-1994 17-09-1994 19-09-1994
EP 1820391	A1	22-08-2007	AU 2007214616 A1 CN 101384164 A EP 1986485 A1 WO 2007093444 A1 JP 2009526536 T US 2009226042 A1	23-08-2007 11-03-2009 05-11-2008 23-08-2007 23-07-2009 10-09-2009
DE 20201033	U1	08-08-2002	PL 113350 U1 TR 200201700 U	28-07-2003 21-08-2003
US 4908985	A	20-03-1990	NONE	
WO 9010273	A1	07-09-1990	DE 3906215 A1 EP 0425595 A1 JP 3504424 T	30-08-1990 08-05-1991 26-09-1991