

**Farms,
Grains,
Vegetables,
Apple Pies,
Multi-billion dollar Industries**

William E. Hilton

IP for Plants

- ⚙ Plant Patent Statute (35 U.S.C. § 161 et seq.)
- ⚙ Plant Variety Protection Act of 1970 (7 U.S.C. § 161 et seq.)
- ⚙ Utility Patent Statute (35 U.S.C. § 101 et seq.)
- ⚙ Trade Secrets (for processes)

Plant Patent Statute (35 U.S.C. § 161 et seq.)

- ⊗ Invents or discovers (in a cultivated area) a new variety of plant
 - must show identifiable features that make it new
 - must establish that the new variety is non-obvious
- ⊗ Must show asexually reproduced the new variety of plant
 - must show all circumstances of the reproduction
- ⊗ USPTO: Rooting cutting, grafting, budding, division etc.

Plant Patent Statute (35 U.S.C. § 161 et seq.)

- ⊗ USPTO grants about 1k to 1.5k / year
 - approximately 24 have been granted for cannabis
- ⊗ Infringement requires asexual reproduction (exact duplication)
- ⊗ Extends only to the plant – it does not protect seed or pollen from the plant from being used
- ⊗ Term is 20 years from filing date of the application



US00PP33483P3

(12) United States Plant Patent
Casano**(10) Patent No.: US PP33,483 P3**
(45) Date of Patent: Sep. 14, 2021**(54) CANNABIS PLANT NAMED 'DIVINA'****(50) Latin Name: *Cannabis sativa* L.**
Varietal Denomination: Divina**(71) Applicant: PhytoPlant Research S.L.,**
(ES)**(72) Inventor: Salvatore Casano, Cordova (ES)****(73) Assignee: PHYTOPLANT RESEARCH S.L.,**
Cordova (ES)**(*) Notice:** Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.**(21) Appl. No.: 16/350,538****(22) Filed: Nov. 28, 2018****(65) Prior Publication Data**

US 2020/0170162 P1 May 28, 2020

(51) Int. Cl.
A01H 5/02 (2018.01)
A01H 6/28 (2018.01)
A61K 36/185 (2006.01)**(52) U.S. Cl.**
USPC Plt/258
CPC A01H 6/28 (2018.05); A61K 36/185
(2013.01)**(58) Field of Classification Search**
USPC Plt/258, 263.1
CPC ... A01H 5/00; A01H 5/12; A01H 6/28; A01H
5/02; A61K 36/185; G06F 3/0481; G06F
2207/00

See application file for complete search history.

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(Continued)

Primary Examiner — June Hwu
(74) Attorney, Agent, or Firm — Tristan A. Fuierer; Olive Law Group, PLLC**(57) ABSTRACT**
The present invention provides a new ornamental variety of *Cannabis sativa* L., named 'Divina'. 'Divina' was developed and obtained from a spontaneous mutation of the parent 'Pilar' and is asexually propagated, having a distinctive "mottled yellow and green leaf" phenotype.**2 Drawing Sheets**

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17**Diameter.**—Apical cyme has 4-6 cm diameter.
Shape.—Elliptical.**Inflorescent bracts.**—Present, several stalked glandular trichomes present only on its upper surface, enclose the flower. Typical length is 2.2-4.1 mm (3 mm average).**Individual flower size.**—Pistillate flowers have a typical length of 7-12 mm (9.2 mm average) and 1.5-2.9 mm width (2 mm average).**Calyces.**—Appressed to the base of the ovary with the corolla as a unified perianth.**Color.**—Variegated green (7.5 GY 3/4) and yellow (2.5 GY 8/4).**Filaments.**—N/A, no staminate flowers observed.**Sigma.**—Length 5-7 mm, about 1 mm wide at base, tapering to distal end. Densely covered with q minute (<1 mm) hairs.**Color.**—Lemony white (2.5 GY 8/2), drying slowly to orange (2.5 YR 5/8) from apex to base after anthesis.**Number.**—2.**Staminate column.**—N/A, no staminate flowers observed.**Fruit.**—An achene in this genus; however, no fruits were seen in absence of viable pollen while fruits were seen in presence of viable pollen produced by other monoecious or dioecious male plants.**Pollen.**—N/A, no staminate flowers observed; however, the artificial production of staminate flowers can be induced by applying silver thiosulfate (STS) to plants in vegetative stage or at the beginning of the flowering stage, meaning that the induced production of viable pollen can be artificially obtained.**Petalage.**—The plant is essentially without petals (apetalous); these are fused and appressed to the base of the ovary with the calyx as the perianth.**Pedicel.**—Flowers are essentially sessile (attached to the stem), and as such have no pedicel.**Trichomes.**—Capitate (stalked) glandular trichomes are transparent or translucent before harvest, and sometimes showing a brownish dot inside. Once harvested, they become pale brown-amber.**General characteristics and culture.****Blooming period.**—Plants will bloom in 4-6 weeks when 12 hours of light/day are applied to induce flowering.**18****Hardiness.**—Probably it is fairly hardy; however, hardiness in nature is unknown as this plant has only been cultivated under controlled conditions.**Breaking action.**—Stems are fibrous, strong and flexible, highly resistant to breakage.**Rooting.**—Approximately 70% success rate with cuttings. After exposing for 2 minutes the basal part of the cuttings to a rooting solution containing natural auxins, treated cuttings were placed in peat cubes.The ranges adopted for climatic parameters were: 22±1° C., 75-85% of relative humidity, 350-400 ppm of carbon dioxide, and under a photon flux density of approximately 100 µE mol m⁻²s⁻¹ provided by light-emitting diodes (LEDs) lights under continuous day-length (24 hours light/day). 'Divina' is susceptible to fungal disease during in vitro rooting.**Growth regulator.**—No growth regulators or hormones were used in the cultivation stages, while in the propagation stage a liquid rooting product containing natural phytohormones was used for stimulating the formation of root primordia and their elongation.**Shipping tolerance.**—The plant has been successfully shipped at controlled temperature (20° C.) by using Clone Shipper, which is a closed shipping container provided by a LED light to keep the plant in the vegetative stage while being shipped for 3-4 days before arriving to its destination.**Shipping quality.**—Not known.**Storage life.**—Not known.**Marker use.**—Ornamental use (potted plants) — medicinal use (fresh and dried leaves and inflorescences, or derived resins and extracts).**Productivity.**—Average total fresh weight: 404.5 g per plant; average total dry weight: 81.58 g per plant; average dry weight of flowers: 19.55% of the plant total dry weight; average dry weight of leaves: 60.55% of the plant total dry weight; average dry weight of stems: 19.9% of the plant total dry weight.

It is claimed:

1. A new and distinct variety of a *Cannabis sativa* L. plant named 'Divina', as shown and described, characterized by a variegated yellow and green foliage.

* * * * *

Plant Variety Protection Act (35 U.S.C. § 161 et seq.)

- ⊗ Registrations provided by U.S. Department of Agriculture
- ⊗ Provides protection directed to novel varieties of sexually reproduced plants by authorizing issuance of Certificates of Plant Variety Protection”
- ⊗ Applies only to seed-bearing plants
- ⊗ Requires Novelty (novel variety): distinctiveness, uniformity and stability – Does not require non-obviousness
- ⊗ Infringing acts include sexually multiplying the variety as well as producing hybrids

Plant Variety Protection Act (35 U.S.C. § 161 et seq.)

- ⊗ Must submit 3,000 seeds with an 85% or more germination rate within 3 months of filing the application
- ⊗ Grants about 400 Certificates annually
- ⊗ None known to be for cannabis, a DEA Schedule 1 drug, BUT Dept. Ag. recently began receiving applications for industrial hemp (*Cannabis sativa* having less than 0.3% THC)
- ⊗ Included in Convention for the Protection of New Varieties of Plants (UPOV)
- ⊗ Term is 20 years from filing date of the application

No.



200700311

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Pioneer Hi-Bred International, Inc.

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

An application requesting a certificate of protection for an alleged distinct variety of sexually reproduced, or tuber propagated plant, the name and description of which are contained in the application and exhibits, a copy of which is hereunto annexed and made a part hereof, and the various requirements of LAW in such cases made and provided have been complied with, and the title thereto is, from the records of the PLANT VARIETY PROTECTION OFFICE, in the applicant(s) indicated in the said copy, and Whereas, upon due examination made, the said applicant(s) is (are) adjudged to be entitled to a certificate of plant variety protection under the LAW.

Now, therefore, this certificate of plant variety protection is to grant unto the said applicant(s) and the successors, heirs or assigns of the said applicant(s) for the term of TWENTY years from the date of this grant, subject to the payment of the required fees and periodic replenishment of viable basic seed of the variety in a public repository as provided by LAW, the right to exclude others from selling the variety, offering it for sale, or reproducing it, or importing it, or exporting it, or conditioning it for propagation, or stocking it for any of the above purposes, or using it in producing a hybrid or different variety therefrom, to the extent provided by the PLANT VARIETY PROTECTION ACT. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

CORN, FIELD

'PHEMP'

In Testimony Whereof, I have hereunto set my hand and caused the seal of the Plant Variety Protection Office to be affixed at the City of Washington, D.C. this twenty-ninth day of September, in the year two thousand and ten.

Attest:

Commissioner
Plant Variety Protection Office
Agricultural Marketing Service

Secretary of Agriculture

REPRODUCE LOCALLY. Include form number and date on all reproductions. Form Approved - CMB No. 0981-0055

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
SCIENCE AND TECHNOLOGY - PLANT VARIETY PROTECTION OFFICE

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE
(Instructions and information collection burden statement on reverse)

The following statements are made in accordance with the Privacy Act of 1974 (5 U.S.C. 552a) and the Paperwork Reduction Act (PRA) of 1995.
Applicant is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

1. NAME OF OWNER Pioneer Hi-Bred International, Inc.	2. TEMPORARY DESIGNATION OR EXPERIMENTAL NAME	3. VARIETY NAME PHEMP
4. ADDRESS (Street and No., or R.F.D. No., City, State, and ZIP Code, and Country) 7301 NW 62nd Avenue Johnston, IA 50131-0085	5. TELEPHONE (include area code) 515/270-4051	FOR OFFICIAL USE ONLY PVPO NUMBER # 200700311 FILING DATE May 7, 2007
6. FAX (include area code) 515/253-2125	7. IF THE OWNER NAMED IS NOT A "PERSON", GIVE FORM OF ORGANIZATION (corporation, partnership, association, etc.) Corporation	8. IF INCORPORATED, GIVE STATE OF INCORPORATION Iowa
9. DATE OF INCORPORATION March 5, 1999	10. NAME AND ADDRESS OF OWNER REPRESENTATIVE(S) TO SERVE IN THIS APPLICATION: (First person listed will receive all papers) Steven R. Anderson Research and Product Development P.O. Box 85 1004 Johnston, IA 50131-0085 1004	FILING AND EXAMINATION FEES: \$ 4382.00 DATE 5/7/07 CERTIFICATION FEE: \$ 768.00 + 411.00 DATE 7/8/10
11. TELEPHONE (include area code) 515/270-4051	12. FAX (include area code) 515/253-2125	13. E-MAIL steven.anderson@pioneer.com
14. CROP KIND (Common Name) Corn	16. FAMILY NAME (Botanical) Gramineae	18. DOES THE VARIETY CONTAIN ANY TRANSGENES? (OPTIONAL) <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
15. GENUS AND SPECIES NAME OF CROP Zea Mays	17. IS THE VARIETY A FIRST GENERATION HYBRID? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	20. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE SOLD AS A CLASS OF CERTIFIED SEED? (See Section 43(x) of the Plant Variety Protection Act) <input type="checkbox"/> YES (if "yes", answer items 21 and 22 below) <input checked="" type="checkbox"/> NO (if "no", go to item 23)
19. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED (Follow instructions on reverse) a. <input checked="" type="checkbox"/> Exhibit A. Origin and Breeding History of the Variety b. <input checked="" type="checkbox"/> Exhibit B. Statement of Distinctness c. <input checked="" type="checkbox"/> Exhibit C. Objective Description of Variety d. <input type="checkbox"/> Exhibit D. Additional Description of the Variety (Optional) e. <input checked="" type="checkbox"/> Exhibit E. Statement of the Basis of the Owner's Ownership f. <input checked="" type="checkbox"/> Voucher Sample (3,000 viable untreated seeds or, for tuber propagated varieties, verification that tissue culture will be deposited and maintained in an approved public repository) g. <input checked="" type="checkbox"/> Filing and Examination Fee (\$4,382), made payable to "Treasurer of the United States" (Mail to the Plant Variety Protection Office)		21. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE LIMITED AS TO NUMBER OF CLASSES? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO IF YES, WHICH CLASSES? <input type="checkbox"/> FOUNDATION <input type="checkbox"/> REGISTERED <input type="checkbox"/> CERTIFIED
23. HAS THE VARIETY (INCLUDING ANY HARVESTED MATERIAL) OR A HYBRID PRODUCED FROM THIS VARIETY BEEN SOLD, DISPOSED OF, TRANSFERRED, OR USED IN THE U. S. OR OTHER COUNTRIES? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO IF YES, YOU MUST PROVIDE THE DATE OF FIRST SALE, DISPOSITION, TRANSFER, OR USE FOR EACH COUNTRY AND THE CIRCUMSTANCES. (Please use space indicated on reverse.)		22. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO IF YES, SPECIFY THE NUMBER 1,2,3, etc. FOR EACH CLASS. <input type="checkbox"/> FOUNDATION <input type="checkbox"/> REGISTERED <input type="checkbox"/> CERTIFIED (If additional explanation is necessary, please use the space indicated on the reverse.)
25. The owners declare that a viable sample of basic seed of the variety has been furnished with application and will be replenished upon request in accordance with such regulations as may be applicable, or for a tuber propagated variety a tissue culture will be deposited in a public repository and maintained for the duration of the certificate. The undersigned owner(s) is(are) the owner of this sexually reproduced or tuber propagated plant variety, and believe(s) that the variety is new, distinct, uniform, and stable as required in Section 42, and is entitled to protection under the provisions of Section 42 of the Plant Variety Protection Act. Owner(s) is (are) informed that false representation herein can jeopardize protection and result in penalties.		24. IS THE VARIETY OR ANY COMPONENT OF THE VARIETY PROTECTED BY INTELLECTUAL PROPERTY RIGHT (PLANT BREEDER'S RIGHT OR PATENT)? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO IF YES, PLEASE GIVE COUNTRY, DATE OF FILING OR ISSUANCE AND ASSIGNED REFERENCE NUMBER. (Please use space indicated on reverse.)
SIGNATURE OF OWNER	SIGNATURE OF OWNER 	
NAME (Please print or type)	NAME (Please print or type) Steven R. Anderson	
CAPACITY OR TITLE	DATE 5-4-2007	CAPACITY OR TITLE Research Scientist

(See reverse for instructions and information collection burden statement)

SMS 12/18/10

SMS 6/12/10

1

Utility Patent Statute (as applied to plants)

- ⚙ Invents or discovers a new and useful process, machine, article of manufacture, or composition of nature
- ⚙ Available (potentially) for plant tissue, cells, seeds or whole plants
- ⚙ Also (potentially) cover parts of the plant, uses of the plant, methods used to create the plant, methods for processing the plant, and even edibles (like brownies) that contain an extract from that plant
- ⚙ Only option for seed-propagated non-hemp cannabis

Utility Patent Statute (as applied to plants)

- ⚙ Close to 400k utility patents grant each year
- ⚙ The USPTO has granted close to 1k utility patents that mention cannabis and specifically recite any of cannabis, THC, CBD or CBN specifically in the claims
- ⚙ Term is 20 years from filing earliest non-provisional application priority filing date of the application
- ⚙ Claims



US011096349B2

(12) **United States Patent**
Leo

(10) **Patent No.:** **US 11,096,349 B2**
(45) **Date of Patent:** **Aug. 24, 2021**

(54) **CANNABIS FARMING SYSTEMS AND METHODS**

(71) Applicant: **Daniel Michael Leo**, Baltimore, MD (US)

(72) Inventor: **Daniel Michael Leo**, Baltimore, MD (US)

(73) Assignee: **INSECTERGY, LLC**, Baltimore, MD (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 792 days.

(21) Appl. No.: **15/667,022**

(22) Filed: **Aug. 2, 2017**

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- A01G 7/04* (2006.01)
- A01G 9/18* (2006.01)
- A01G 9/24* (2006.01)
- A01G 31/02* (2006.01)
- A01G 25/16* (2006.01)
- A21D 13/04* (2017.01)
- A01G 22/00* (2018.01)
- A01G 24/00* (2018.01)
- A01H 6/28* (2018.01)
- A01H 5/02* (2018.01)
- A21D 2/36* (2006.01)
- A01H 5/10* (2018.01)
- A01G 24/48* (2018.01)
- A01G 24/18* (2018.01)
- H05B 45/20* (2020.01)

(Continued)

(52) **U.S. CL.**

CPC *A01H 5/12* (2013.01); *A01G 7/04* (2013.01); *A01G 9/18* (2013.01); *A01G 9/20* (2013.01); *A01G 9/246* (2013.01); *A01G 22/00* (2018.02); *A01G 24/00* (2018.02); *A01G 25/16* (2013.01); *A01G 31/02* (2013.01); *A01H 5/02* (2013.01); *A01H 6/28* (2018.05); *A21D 2/36* (2013.01); *A21D 13/04* (2013.01); *A01G 24/18* (2018.02); *A01G 24/48* (2018.02); *H05B 45/20* (2020.01); *H05B 47/11* (2020.01); *H05B 47/16* (2020.01)

(58) **Field of Classification Search**

CPC *A01G 22/00*; *A01G 24/00*; *A01G 31/02*; *A01G 7/045*
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

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Kim, H., HortScience (2004) vol. 36, No. 7, pp. 1617-1622. (Year: 2004)*

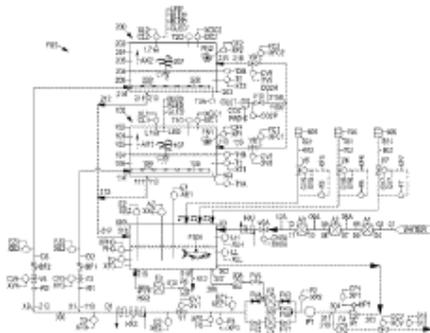
(Continued)

Primary Examiner — Russell Kallis

(57) **ABSTRACT**

Methods to produce *cannabis* plants are described, the methods include growing the *cannabis* plants in a growing medium within an interior of an enclosure by providing a common reservoir including water, and transferring the water from the common reservoir to the *cannabis* plants within the interior of the enclosure, the water within the common reservoir includes, fish, treated water, evaporator condensate, and a microorganism. Methods to asexually clone, harvest, trim, grind, and heat the *cannabis* plants are also described.

30 Claims, 23 Drawing Sheets



(a5) the cloning enclosure (CHD) has an interior (CHD-1), the cloning enclosure (CHD) is configured to contain water vapor within the interior (CHD-1) to provide a humid environment for plants within the interior (CHD-1);

(b) introducing the rooting solution and the growing medium to the plurality of containers;

(c) using the cutting tool to sever the tips from a plurality of Mrs. Grass Weedly plants to form a plurality of severed plants (107X, 207X);

(d) inserting the plurality of severed plants (107X, 207X) of step (c) into the plurality of containers;

(e) placing the plurality of containers within the interior of the cloning enclosure;

(f) illuminating the plants after step (e);

(g) growing the plants for 4 to 20 days or until roots are formed; and

(h) optionally venting the interior of the cloning enclosure; wherein: the carbohydrates are comprised of one or more from the group consisting of sugar, sucrose, molasses, and plant syrups;

the enzymes are comprised of one or more from the group consisting of amino acids, orotidine 5'-phosphate decarboxylase, OMP decarboxylase, glucanase, beta-glucanase, cellulase, xylanase, Hygrozyme®, Cannazyme®, Microzyme®, and Sensizyme®;

the vitamins are comprised of one or more from the group consisting of vitamin B, vitamin C, vitamin D, and vitamin E;

the hormones are comprised of one or more from the group consisting of auxins, cytokinins gibberellins, abscisic acid, brassinosteroids, salicylic acid, jasmonates, plant peptide hormones, polyamines, nitric oxide, strigolactones, and triacetonol;

the microorganisms are comprised of one or more from the group consisting of bacteria, diazotroph bacteria, diazotroph archaea, azotobacter *vinelandii*, *Clostridium pasteurianum*, fungi, arbuscular mycorrhizal fungi, *mycorrhiza*, *Glomus aggregatum*, *Glomus etunicatum*, *Glomus intraradices*, *Rhizophagus irregularis*, and *Glomus mosseae*.

What is claimed is:
1. A method to produce harvested asexually cloned *cannabis* plants, the method includes:
(a) severing a plurality of tips from a plurality of *cannabis* plants to produce a plurality of severed *cannabis* plants;

(b) growing the plurality of severed *cannabis* plants in a mixture of a rooting solution and a first growing medium to produce a plurality of young asexually cloned *cannabis* plants including roots;

(c) transferring the plurality of young asexually cloned *cannabis* plants to a second growing medium, the second growing medium is configured to grow the plurality of young asexually cloned *cannabis* plants into a plurality of adult asexually cloned *cannabis* plants;

(d) growing the plurality of young asexually cloned *cannabis* plants in the second growing medium within an interior of an enclosure to produce the plurality of adult asexually cloned *cannabis* plants;

(e) harvesting the plurality of adult asexually cloned *cannabis* plants to produce harvested asexually cloned *cannabis* plants;

wherein:
in step (d), providing a common reservoir including water, and transferring the water from the common reservoir

to the young asexually cloned *cannabis* plants and/or adult asexually cloned *cannabis* plants, the water within the common reservoir includes:

(i) fish, wherein the fish excrete nitrogen, and the nitrogen is included within the water within the common reservoir;

(ii) treated water, the treated water is treated with a water treatment unit, the water treatment unit includes one or more water treatment units selected from the group consisting of an adsorbent, an ion-exchange resin, a catalyst, a membrane, and a filter;

(iii) evaporator condensate, wherein the evaporator condensate is produced by condensing water vapor from within the interior of the enclosure; and

(iv) a microorganism.

2. The method according to claim 1, wherein: in step (b), the rooting solution includes water and a hormone, the hormone is comprised of one or more from the group consisting of auxins, brassinosteroids, salicylic acid, jasmonates, plant peptide hormones, polyamines, nitric oxide, strigolactones, and triacetonol.

3. The method according to claim 1, further comprising: in step (d), producing the plurality of adult asexually cloned *cannabis* plants, according to a method the method includes:

(d1) providing the plurality of young asexually cloned *cannabis* plants including roots, stems, and leaves;

(d2) after step (d1), growing at least a portion of the plurality of young asexually cloned *cannabis* plants by illuminating the plurality of young asexually cloned *cannabis* plants with a plurality of blue lights and/or green lights; and

(d3) after step (d2), growing at least a portion of the plurality of young asexually cloned *cannabis* plants by illuminating the young asexually cloned *cannabis* plants with a plurality of red lights to produce the plurality of adult asexually cloned *cannabis* plants including roots, stems, leaves, and buds.

4. The method according to claim 1, wherein: in step (d), growing the plurality of young asexually cloned *cannabis* plants by providing the young asexually cloned *cannabis* plants with a liquid mixture including a macro-nutrient and a micro-nutrient:

wherein: the macro-nutrient is comprised of two or more selected from the group consisting of nitrogen, phosphorus, potassium, calcium, magnesium, and sulfur; the micro-nutrient is comprised of two or more selected from the group consisting of iron, manganese, boron, molybdenum, copper, zinc, sodium, chlorine, and silicon.

5. The method according to claim 4, wherein: the liquid mixture includes a pH ranging from 5.15 to 6.75.

6. The method according to claim 1, further comprising: in step (d), growing the plurality of young asexually cloned *cannabis* plants and/or the plurality of adult asexually cloned *cannabis* plants using a method including:

(d1) in step (d), providing the water;

(d2) after step (d1), pressurizing the the water to produce pressurized water;

(d3) after step (d2), filtering the pressurized water to produce pressurized filtered water;

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- (d4) after step (d3), splining the pressurized filtered water into a plurality of streams of pressurized filtered water;
- (d5) after step (d4), depressurizing the plurality of streams of pressurized filtered water across a plurality of restrictions to produce a plurality of streams of depressurized filtered water, the plurality of streams of depressurized filtered water have a reduced pressure relative to the plurality of streams of pressurized filtered water; and
- (d6) after step (d5), introducing the plurality of streams of depressurized filtered water to the plurality of young asexually cloned *cannabis* plants and/or the plurality of adult asexually cloned *cannabis* plants.
7. The method according to claim 6, further comprising: after step (d1), mixing at least a portion of the water with two or more selected from the group consisting of a pH adjustment solution, a macro-nutrient, a micro-nutrient, a carbohydrate, an enzyme, and a vitamin; wherein: the macro-nutrient is comprised of one or more selected from the group consisting of nitrogen, phosphorus, potassium, calcium, magnesium, and sulfur; the micro-nutrient is comprised of one or more selected from the group consisting of iron, manganese, boron, molybdenum, copper, zinc, sodium, chlorine, and silicon; the carbohydrate is comprised of one or more selected from the group consisting of sugar, sucrose, molasses, and a plant syrup; the enzyme is comprised of one or more selected from the group consisting of amino acids, coenzyme 5'-phosphate decarboxylase, OMP decarboxylase, glucanase, beta-glucanase, cellulase, and xylanase; and the vitamin is comprised of one or more selected from the group consisting of vitamin B, vitamin C, vitamin D, and vitamin E.
8. The method according to claim 1, wherein: in step (d), growing at least a portion of the plurality of young asexually cloned *cannabis* plants and/or the plurality of adult asexually cloned *cannabis* plants according to using a method including: (d1) providing: a carbon dioxide tank that contains pressurized carbon dioxide, at least one valve configured to transfer carbon dioxide from the carbon dioxide tank into the interior of the enclosure; and a gas quality sensor configured to monitor the concentration of carbon dioxide within the interior of the enclosure;
- (d2) after step (d1), measuring the concentration of carbon dioxide within the interior of the enclosure with the gas quality sensor; and
- (d3) after step (d2), adjusting the carbon dioxide concentration within the interior of the enclosure to a range between 400 and 5,000 parts per million by passing the carbon dioxide through the valve; wherein: the pressure drop across the valve is greater than 50 pounds per square inch.
9. The method according to claim 1, wherein: in step (d), growing at least a portion of the plurality of young asexually cloned *cannabis* plants and/or the plurality of adult asexually cloned *cannabis* plants according to using a method including:

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- (d1) providing: a temperature sensor configured to measure the temperature within the interior of the enclosure; a control unit configured to maintain a predetermined temperature within the interior of the enclosure; and a computer, wherein the control unit is communicatively coupled to the computer to maintain the temperature within the interior of the enclosure;
- (d2) after step (d1), measuring the temperature within the interior of the enclosure with the temperature sensor; and
- (d3) after step (d2), maintaining a predetermined temperature within the interior of the enclosure by adjusting the control unit with the computer.
10. The method according to claim 1, wherein: in step (d), growing at least a portion of the plurality of young asexually cloned *cannabis* plants and/or the plurality of adult asexually cloned *cannabis* plants according to using a method including: (d1) providing: a humidity sensor configured to measure the humidity within the interior of the enclosure; a control unit configured to maintain a predetermined humidity within the interior of the enclosure; and a computer, wherein the control unit is communicatively coupled to the computer to maintain the humidity within the interior of the enclosure;
- (d2) after step (d1), measuring the humidity within the interior of the enclosure with the humidity sensor; and
- (d3) after step (d2), maintaining a predetermined humidity within the interior of the enclosure by adjusting the control unit with the computer.
11. The method according to claim 1, wherein: in step (d), growing at least a portion of the plurality of young asexually cloned *cannabis* plants and/or the plurality of adult asexually cloned *cannabis* plants according to using a method including: (d1) providing: a greenhouse comprising the enclosure including the interior, the plurality of young asexually cloned *cannabis* plants and/or the plurality of adult asexually cloned *cannabis* plants are positioned within the interior of the greenhouse; the greenhouse is configured illuminate the plurality of young asexually cloned *cannabis* plants and/or the plurality of adult asexually cloned *cannabis* plants; and
- (d2) growing and illuminating the plurality of young asexually cloned *cannabis* plants and/or the plurality of adult asexually cloned *cannabis* plants within the interior of the greenhouse.
12. The method according to claim 1, comprising: in step (b), growing the plurality of severed *cannabis* plants within an interior of a cloning enclosure according to a method including: (b 1) providing the cloning enclosure, the cloning enclosure is configured to include water vapor within the interior to provide a humid environment for the plurality of severed *cannabis* plants positioned within the interior; and

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- (b2) after step (b 1), growing the plurality of severed *cannabis* plants within the first growing medium within the interior of the cloning enclosure until the roots are formed.
13. The method according to claim 1, comprising: (f) introducing at least a portion of the harvested asexually cloned *cannabis* plants to a *cannabis* trimmer, the harvested asexually cloned *cannabis* plants include a mixture of *cannabis* buds and *cannabis* leaves, the *cannabis* trimmer is configured to trim the *cannabis* leaves from the *cannabis* buds to produce trimmed asexually cloned *cannabis* buds which are essentially free of *cannabis* leaves by applying a rotational motion to the mixture of the *cannabis* buds and the *cannabis* leaves to pass the mixture of *cannabis* buds and *cannabis* leaves across a blade;
- (g) grinding the trimmed asexually cloned *cannabis* buds to produce ground asexually cloned *cannabis*; and
- (h) heating the ground asexually cloned *cannabis* with a heater to effectuate a decarboxylation reaction to remove a carboxyl group from the ground asexually cloned *cannabis* to form the decarboxylated and ground asexually cloned *cannabis*.
14. The method according to claim 13, wherein: the trimmed asexually cloned *cannabis* buds include: a diameter ranging from between 0.25 inches to 3 inches; and a length ranging from between 0.75 inches to 10 inches.
15. The method according to claim 1, wherein: in step (b), the first growing medium includes rockwool.
16. The method according to claim 1, wherein: in step (b), the first growing medium includes a gel.
17. The method according to claim 1, wherein: in step (b), the first growing medium includes oasis cubes.
18. The method according to claim 1, wherein: in step (b), the first growing medium includes quartz.
19. The method according to claim 1, wherein: in step (b), the first growing medium includes foam.
20. The method according to claim 1, wherein: in step (b), the first growing medium includes coco-coir and/or fibrous coconut husks.
21. The method according to claim 1, wherein: in step (b), the first growing medium includes amorphous volcanic glass.
22. The method according to claim 1, wherein: in step (b), the first growing medium includes clay and/or LECA (lightweight expanded clay aggregate).
23. The method according to claim 1, wherein: in step (b), the first growing medium includes one or more selected from the group consisting of sand, plastic, polyethylene, high-density polyethylene (HDPE), low-

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- density polyethylene (LDPE), polyethylene terephthalate (PET), and polyacrylonitrile.
24. The method according to claim 1, wherein: in step (c), the second growing medium includes peat moss, perlite, coco-coir, and an arbuscular mycorrhizal fungi.
25. The method according to claim 1, wherein: in step (c), the second growing medium includes one or more selected from the group consisting of plastic, polyethylene, high-density polyethylene (HDPE), low-density polyethylene (LDPE), polyethylene terephthalate (PET), and polyacrylonitrile.
26. The method according to claim 1, wherein: in step (c), the second growing medium includes one or more selected from the group consisting of rockwool, perlite, amorphous volcanic glass, vermiculite, clay, clay pellets, LECA (lightweight expanded clay aggregate), coco-coir, fibrous coconut husks, soil, dirt, peat, peat moss, sand, compost, manure, fir bark, foam, gel, oasis cubes, lime, gypsum, and quartz.
27. The method according to claim 1, wherein: in step (c), the second growing medium includes a fungus.
28. The method according to claim 1, wherein: in step (c), the second growing medium includes the microorganism.
29. The method according to claim 1, wherein: the microorganism is comprised of one or more selected from the group consisting of bacteria, diazotroph bacteria, diazotroph archaea, azotobacter *vinelandii*, fungi, arbuscular mycorrhizal fungi, *Glomus etunicatum*, *Glomus intraradices*, *Rhizoglyphus irregularis*, and *Glomus mossae*.
30. A method to grow *cannabis* plants in a growing medium within an interior of an enclosure by providing a common reservoir including water, and transferring the water from the common reservoir to the *cannabis* plants within the interior of the enclosure, the water within the common reservoir includes:
- fish, wherein the fish excrete nitrogen, and the nitrogen is included within the water within the common reservoir;
 - treated water, the treated water is treated with a water treatment unit, the water treatment unit includes one or more water treatment units selected from the group consisting of an adsorbent, an ion-exchange resin, a catalyst, a membrane;
 - evaporator condensate, wherein the evaporator condensate is produced by condensing water vapor from within the interior of the enclosure; and
 - a microorganism.
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Trade Secrets

- ⚙ Requires active steps to maintain secrecy even within company
- ⚙ Claim requires establishing TS (need documents):
 - identify the TS with particularity
 - show access to TS is limited within company
 - show who has had access, when and why
- ⚙ Potentially Last Forever

SUMMARY

- > Plant Patents
- > PVPA Certificates
- > Utility Patents
- > Trade Secrets