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(12) **United States Plant Patent**
Zimmermann

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(54) **HOP PLANT NAMED YCR ACCESSION NO.**
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(* **Notice:** Subject to any disclaimer, the term of this
patent is extended or adjusted under 35
U.S.C. 154(b) by 0 days.

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(52) **U.S. Cl.** **Plt./236**

(58) **Field of Search** **Plt./236**

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(57) **ABSTRACT**

A new hop plant variety is disclosed. The variety is a cultivar of recent origin, used for its bittering and aromatic properties. The new variety is moderately tolerant to powdery mildew and Sphaerotheca. The new variety produces a medium size cone with good pickability and storageability. The cones mature relatively late, and crop yield is 2750 to 3000 pounds per acre (3080 to 3360 kg/ha).

8 Drawing Sheets

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**BACKGROUND AND SUMMARY OF
INVENTION**

This invention relates to a new and distinct variety of hop plant, and more particularly to a new hop plant variety of unknown parentage which was discovered among plants created as part of a controlled breeding program. The new variety has been stably reproduced over successive generations. Discovery of the new variety and initial reproduction by root cuttings was carried out in a research nursery in Prosser, Wash., U.S.A. Subsequent asexual reproduction took place in Granger, Wash., U.S.A.

THE DRAWINGS

- FIG. 1 shows a hop cone of the new hop plant variety;
- FIG. 2 shows a cluster of hop cones of the new hop variety;
- FIG. 3 shows hop cones of the new hop variety;
- FIG. 4 shows a blossom and leaf of the new hop plant variety;
- FIG. 5 shows a leaf on the new hop plant variety;
- FIG. 6 shows a bine of the new hop plant variety;
- FIG. 7 shows a bine of the new hop plant variety; and
- FIG. 8 shows a hop plant of the new variety.

DESCRIPTION OF THE VARIETY

The new hop plant variety is a cultivar of recent origin, used for its bittering and aromatic properties. The new variety is moderately tolerant to powdery mildew and Sphaerotheca. The new variety produces a medium size cone with good pickability (similar to Nugget, unpatented) and storageability (18% to 20% alpha loss after 6 months common storage). The cones mature relatively late (after Sep. 15 in Granger, Wash., and crop yield is 2750 to 3000 pounds per acre (3080 to 3360 kg/ha).

The following is a detailed botanical description of the new and distinct variety of *Humulus lupulus*, based on observations of specimens grown in Granger, Wash. during the 1998 growing season. All colors are described according to The Royal Horticultural Society Colour Chart. It should

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be understood that the botanical and analytical chemical characteristics described will vary somewhat depending upon cultural practices and climatic conditions and can vary with location and season.

- 1. **Bine:**
 - Color*.—Yellow green (146D).
 - Stripe*.—Greyed purple (183C).
 - Stipule color*.—Light green (146B 146C).
 - Stipule direction*.—Up.
 - Diameter*.—1.0 cm (measurement taken at 2.75 m).
 - Shoot emergence*.—Late; similar to Nugget.
- 2. **Leaves:**
 - Leaf arrangement*.—Opposite.
 - Leaf shape*.—Cordate to palmate.
 - Average length*.—20.2 cm.
 - Average width*.—20.1 cm.
 - Color — upper surface, mature*.—Yellow green (147A).
 - Color — lower surface, mature*.—Green (137C).
 - Color — upper surface, immature*.—Green (137A).
 - Color — lower surface, immature*.—Green (146A).
 - Number of leaf lobes*.—1–5.
 - Margin*.—Serrate.
 - Serrations per inch*.—3 min., 5 max.
 - Pose*.—Downward.
 - Average petiole length*.—7.4 cm.
 - Petiole color at base*.—Greyed purple (183C).
 - Venation*.—Palmate.
- 3. **Cones**
 - Average length*.—3.2 cm.
 - Average diameter*.—1.6 cm.
 - Color*.—Bract tip: Yellow green (144A). Bract base: Yellow green (145C). Bracteole: Yellow green (145C).
 - Shape*.—Conic.
 - Bract shape*.—Ovate.
 - Bract tip shape*.—Acute.
 - Bract tip position*.—Recurved.
 - Bracteole shape*.—Ovate.
 - Shattering potential at harvest*.—Medium to medium-high; Similar to Cluster.

% Alpha acids.—15.0%–17.0% of cone weight (ASBC Spectrophotometric method).

% Beta acids.—4.5%–5.5% of cone weight (ASBC Spectrophotometric method).

% Cohumulone.—24.0%–26.0% of alpha acids.

Total oils.—1.0–2.0 mL/100 g.

Aroma.—Mild, citrus with piney notes.

4. Technical data: Essential Oil Profile of YCR Accession No. 5: 112 mg of 10% Adsorbate/150C/5 Min. by DTD-GC-MS.

MS Spec #	Area Integration	Peak Assignment	Area %
55–213	27156	acetone + isoprene + trace of dimethylsulfide	0.460
227–292	15055	2-methyl-3-buten-1-ol	0.255
351	2363	acetic acid	0.040
361	1044	methylpentanone	0.018
372	1194	? m/z 56, 70 peaks	0.020
402	808	3-methyl-2-butenal	0.014
414	460	hexanal	0.008
425	1558	isobutyric acid	0.026
430	1318	n-octane	0.022
483	5004	3-methylbutyric acid	0.085
489	1531	2-methylbutyric acid	0.026
507	566	2-methyl-2-butanol acetate	0.010
521	6875	? m/z 82/81/67 peaks	0.116
526	3067	2,6-dimethyl-2,4-heptadiene + methyl ester of unsat. fatty acid	0.052
534	3429	5,5-dimethyl-2(SH)-furanone	0.058
543	1105	alpha-pinene	0.019
552	170	propylisobutyrate	0.003
556	604	4-methylpentanoic acid	0.010
566	7373	2-methylbutylpropanoate	0.125
575	154	6-methyl-5-heptene-2-one	0.003
579	15126	beta-pinene + hexanoic acid	0.256
592	1149118	myrcene	19.472
596	2969	isobutyl-2-methylbutyrate	0.050
604	14748	3-methylbutylisobutyrate	0.250
608	29136	2-methylbutylisobutyrate	0.494
612	15786	methylheptanoate	0.267
615	307	alpha-terpinene	0.005
618	647	p-cymene	0.011
626	10479	limonene + beta-phellandrene	0.178
631	318	? terpene	0.005
641	16482	beta-ocimene + pentyl-2-methylpropanoate	0.279
653	332	gamma-terpinene	0.006
659	1394	isooctanol	0.024
669	5961	heptanoic acid	0.101
673	13282	methyl-6-methylheptanoate	0.225
679	759	linalool oxide + terpinolene	0.013
688	34689	linalool + nonanal	0.588
694	5119	2-methylbutyl-2-methylbutyrate	0.087
697	6371	pentyl-3-methylbutyrate	0.108
704	369	? sulfur-containing compd.	0.006
710	36928	methylheptanoate	0.626
722	1670	2,3-dihydro-3,5-dihydroxy-6-methyl-4(H)-pyran-4-one	0.028
731	3204	octanoic acid (branched isomer)	0.054
739	2549	hexylisobutyrate	0.043
748	119	cis-3-hexenylisobutyrate	0.002
760	508	octanoic acid	0.009
771	35739	? 130 m.w. branched alcohol m/z 59 base peak	0.606
778	2177	4,8-dimethyl-1,7-nonadiene	0.037
783	2014	2-decanone	0.034
788	2362	methyl-4-octenoate	0.040
799	7125	2-decanol	0.121
807	2241	methylnonenoate	0.038
815	487	? 164 m.w. w/149 base peak (phenolic ?)	0.008
823	19878	methylnonanoate	0.337
829	605	nerol	0.010
835	174	?	0.003

-continued

MS Spec #	Area Integration	Peak Assignment	Area %
842	211	2-methylheptylpropanoate	0.004
853	1192	heptylbutyrate	0.020
857	36749	geraniol + 2-undecanone (branched isomer)	0.623
869	345	methyl-2-methylnonenoate	0.006
878	3149	2-undecanol (branched isomer)	0.053
882	8038	nonanoic acid	0.136
894	8369	undecenyl alcohol	0.142
905	50462	methyldecanoate (branched isomer) + 2-undecanone	0.855
911	356	?	0.006
922	42630	2-undecanol	0.722
926	423469	methyl-4-decenoate + methyl-4,8-decadienoate	7.176
941	13718	methylgeranate	0.232
947	41983	methyldecanoate	0.711
977	3099	octyl-2-methylpropanoate	0.053
983	194	? unsaturated alcohol or aldehyde	0.003
992	4651	methyl-2-undecenoate	0.079
1000	4471	alpha-cubebene	0.076
1006	1557	decanoic acid	0.026
1016	1543	geranyl acetate	0.026
1024	469	? acetate	0.008
1029	3764	alpha-ylangene	0.064
1035	15885	alpha-copaene	0.269
1040	314	methylundecenoate	0.005
1050	2284	? 204 m.w. sesquiterpene	0.039
1054	319	?	0.005
1058	678	? 204 m.w. sesquiterpene	0.011
1073	1382	? sesquiterpene 206 m.w. 163 base peak	0.023
1081	327	methylundecanoate	0.006
1094	1310323	caryophyllene	22.204
1102	26956	beta-cubebene	0.457
1107	248	linalylisobutyrate	0.004
1113	333	3-methylbutyloctanoate	0.006
1123	1129	? 204 m.w. sesquiterpene	0.019
1138	1860954	humulene	31.534
1143	5515	? 204 m.w. sesquiterpene 161 base peak	0.093
1159	57015	gamma-cadinene	0.966
1163	3545	gamma-muuroline	0.060
1173	72413	beta-selinene	1.227
1180	12060	alpha-amorphene	0.204
1186	95684	alpha-selinene	1.621
1197	3050	delta-cadinene	0.052
1205	47521	alpha-muuroline	0.805
1209	2391	calamenene	0.041
1216	76149	beta-cadinene	1.290
1228	6676	delta-selinene	0.113
1235	11325	sesquiterpene w/no common name CAS#16728-99-7, cadinene-type	0.192
1245	3020	selina-3,7-diene (eudesma-3,7-diene)	0.051
1261	1561	germacrene B or patchoulene	0.026
1272	437	caryophyllyl alcohol	0.007
1285	24922	caryophyllene oxide	0.422
1303	2938	humulene epoxide	0.050
1308	440	methyltridecenoate	0.007
1317	32095	humulene epoxide	0.544
1323	1479	globulol	0.025
1328	2913	delta-cadinol	0.049
1334	238	?	0.004
1338	122	?	0.002
1343	12459	cadinol isomer	0.211
1355	12157	cadinol	0.206
1371	16917	alpha-cadinol + Juniper Camphor (eudesma-7-en-4-ol)	0.287
1391	906	eudesmol	0.015
1443	528	caryophyllyl acetate	0.009
1524	1363	? 250 m.w. w/115 base peak	0.023
5901396 Total Essential Oil Components			100.000

I claim:

1. A new variety of hop plant substantially as herein shown and described.

* * * * *



FIG. 1



FIG. 2

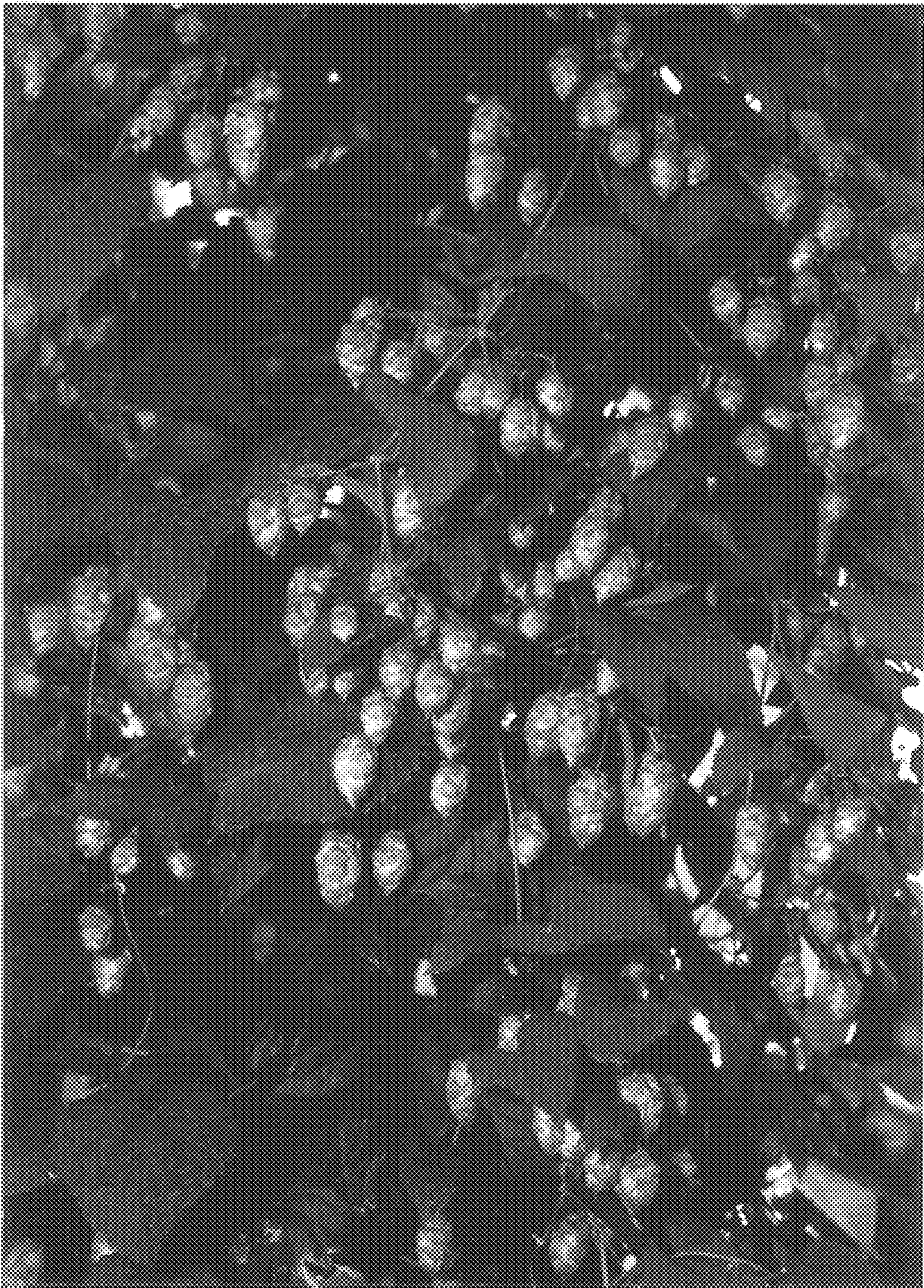


FIG. 3



FIG. 4



FIG. 5



FIG. 6



FIG. 7

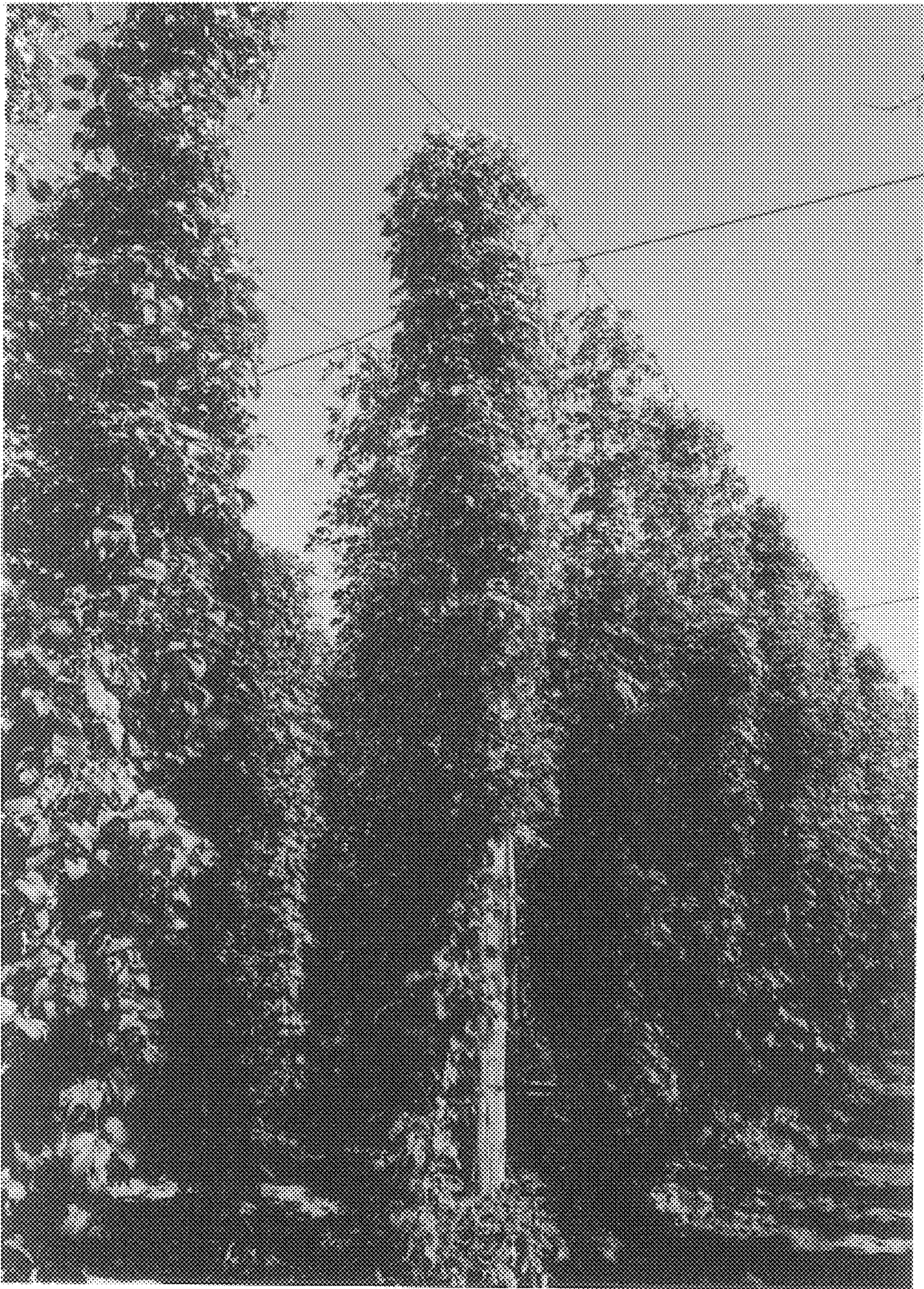


FIG. 8

UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : PP 12,404 P2
DATED : February 12, 2002
INVENTOR(S) : Charles E. Zimmermann

Page 1 of 1

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Title page,

Item [73], Assignee, replace "Sunnyvale, CA" with -- Sunnyside, WA --.

Signed and Sealed this

Seventeenth Day of September, 2002

Attest:

A handwritten signature in black ink, appearing to read "James E. Rogan", written over a horizontal line.

Attesting Officer

JAMES E. ROGAN
Director of the United States Patent and Trademark Office