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(54) **KIWI PLANT NAMED ‘AU GULF COAST GOLD’**

(50) Latin Name: *Actinidia chinensis* Planch
Varietal Denomination: **AU Gulf Coast Gold**

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CPC **A01H 5/08** (2013.01)

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USPC Plt./156
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See application file for complete search history.

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(57) **ABSTRACT**

‘AU Gulf Coast Gold’ is a new golden-fleshed cultivar of *Actinidia chinensis* Planch with a low chilling requirement. ‘AU Gulf Coast Gold’ fruit is large, cylindrical and uniform in shape with yellow flesh that has a thick sweet flavor and delicious taste. ‘AU Gulf Coast Gold’ fruit has a high percent soluble solids and dry matter content. Vegetative bud burst begins in late March to early April and flowering begins on average April 18-20 in central Alabama. Fruit typically reaches maturity September 21-25 in central Alabama with an internal color hue of less than 103°.

8 Drawing Sheets

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Latin name of the genus and species of the plant claimed:
Actinidia chinensis Planch.

Variety denomination: ‘AU GULF COAST GOLD’.

BACKGROUND OF THE INVENTION

The genus *Actinidia* is native to China and is comprised of more than 50 species. *Actinidia chinensis* Planch and *Actinidia deliciosa* (A. Chev). C.F. Liang and A.R. Ferguson are the two most important commercial *Actinidia* species. *Actinidia chinensis* is more precocious and productive and the fruit are more attractive in appearance with less pubescence on the fruit skin than *A. deliciosa*.

Kiwifruit plants are dioecious and have vegetative and compound buds with flower clusters produced in the leaf axils of the first four to six nodes of shoots arising from buds on one year old shoots. Male and female flowers are perfect morphologically. The female flower contains some anthers, but only the stigma is functional, whereas the flower on a

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male vine typically produces 125-185 large anthers that surround a small vestigial stigma. For pollination and fruit set to occur, the female plant must be in close proximity of a male plant whose bloom period occurs at the same time as the female plant’s bloom period.

‘AU Gulf Coast Gold’ is a new golden-fleshed cultivar of *Actinidia chinensis* Planch. It is a bud mutation that occurred on a ‘AU Golden Sunshine’ (U.S. Plant Pat. No. 22,159) plant in a cultivated and maintained orchard to evaluate kiwifruit cultivar performance at Fairhope, Baldwin County, Ala. Based on the genetic marker comparison of ‘AU Golden Sunshine’ (patented) and ‘AU Gulf Coast Gold’, the genetic distinction between these two cultivars is strong (Table 1). Wood from this plant was grafted onto *Actinidia deliciosa* kiwifruit plants at Clanton, Chilton County, Ala., where it has been grown and evaluated since 1999. ‘AU Gulf Coast Gold’ has been asexually reproduced at Auburn, Clanton and Reeltown, Ala. and Marysville and Reedly,

Calif., USA by rooting softwood and hardwood cuttings, by whip and cleft grafting and tissue culture. Genetics have been stable through succeeding asexual propagation.

'AU Gulf Coast Gold' fruit is large, cylindrical and uniform in shape with golden flesh that has a thick sweet flavor and delicious taste. 'AU Gulf Coast Gold' fruit has high percent soluble solids and dry matter typically higher than 'AU Golden Sunshine' (patented) and comparable to slightly lower than 'Hort 16A' *A. chinensis* (U.S. Plant Pat. No. 11,066) (Table 2). Dry matter content, a positively correlated indicator of soluble solids content of kiwifruit when allowed to ripen, appears to be closely related to fruit development period, and 'AU Gulf Coast Gold' has a longer fruit development period compared to 'AU Golden Sunshine' (patented) and a shorter fruit development period compared to 'Hort 16A' (patented). Increasing dry matter content has been shown to increase purchase likelihood for kiwifruit (Jaeger et al., 2011). 'AU Gulf Coast Gold' bloom period begins 1-2 days before 'AU Golden Sunshine' (patented), and is completed 2 days before 'AU Golden Sunshine' (patented) bloom period (Table 3).

SUMMARY OF THE INVENTION

The present invention relates to a new and distinct early to mid season ripening yellow fleshed kiwifruit cultivar that produces cylindrical, uniformly shaped fruit with the stylar end rounded to somewhat pointed, and the shape on the stalk end rounded and narrow. Fruit skin color is grey brown (N199B) color with medium density of uniform short lanulose hairs on fruit skin surface (Table 4). At maturity, the fruit surface appears brown due to the lanulose hairs.

The new cultivar is able to be asexually reproduced by softwood and hardwood cuttings or by grafting onto a rootstock. The unique characteristics come true to form and are established and transmitted through succeeding asexual propagations. 'AU Gulf Coast Gold' has been asexually propagated by rooting softwood and hardwood cuttings, and by whip and cleft grafting in Alabama and California, USA.

Kiwifruit plants are dioecious and have vegetative and compound buds with flower clusters produced in the leaf axils of the first four to six nodes. Male and female flowers are perfect morphologically. The female flower contains some anthers but only the stigma is functional whereas the flower on a male vine typically produces 125 to 185 large anthers that surround a small, vestigial stigma. In Alabama, 'AU Golden Tiger' (U.S. Plant Pat. No. 22,140) and 'Chieftain' (unpatented) are the male cultivars used as pollinizers. 'AU Golden Tiger' (patented) bloom period begins with 'AU Gulf Coast Gold', and 'Chieftain' bloom period begins during the latter part of 'AU Gulf Coast Gold' bloom period.

Kiwifruit buds enter endodormancy during winter, which requires a minimum number of chilling hours for maximum budbreak and bloom. Floral uniformity and density in spring is directly related to the amount of chilling received during winter. It is believed the more accurate measure of chilling hours is Richardson units, which are defined as the accumulated hours between 0° C. and 7° C.

For maximum bud break and flowering of 'AU Golden Sunshine' (patented) to occur it was determined that 700 hours of chilling was required and after the chilling requirements was met 15000 growing degree hours were necessary for bud break (Wall et al. 2008). 'AU Gulf Coast Gold' has similar chilling requirement as 'AU Golden Sunshine' (patented). The high growing degree hours requirement results

in a late bud break and blooming period that typically occurs after the danger of a late spring frost. 'AU Gulf Coast Gold' has performed well in central Alabama where it receives an average winter chilling of 800-1200 hours.

In central Alabama, 'AU Gulf Coast Gold' flowers begin to open ~2 days before 'AU Golden Sunshine' (patented) and its fruit ripens several weeks after 'AU Golden Sunshine' in the fall. 'AU Gulf Coast Gold' reaches harvest maturity 21-30 days after 'AU Golden Sunshine' (patented) (Table 2). 'AU Gulf Coast Gold' has a cylindrical fruit shape, as does 'AU Golden Sunshine' (patented). However, the stylar end is rounded to somewhat pointed in comparison to the rounded stylar end of 'AU Golden Sunshine' (patented). The shape of the shoulder on the stalk end of 'AU Gulf Coast Gold' is rounded and narrow in comparison to the rounded to flat shoulder on the stalk end of 'AU Golden Sunshine' (patented).

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a photograph of 'AU Golden Sunshine' (patented) fruit (on left) and 'AU Gulf Coast Gold' fruit (on right).

FIG. 2 is a photograph of 'AU Gulf Coast Gold' fruit cut in half lengthwise and widthwise to illustrate flesh color.

FIG. 3 is a photograph of 'AU Gulf Coast Gold' flowers and flower buds on a 16-year old grafted plant.

FIG. 4 is photograph of 'AU Gulf Coast Gold' flower bud density on 16-year old grafted plant.

FIG. 5 is a photograph of 'AU Gulf Coast Gold' flowers at different stages of development to illustrate flower bud density on a 16-year old grafted plant.

FIG. 6 is a photograph of 'AU Gulf Coast Gold' fruit on 16-year old grafted plant.

FIG. 7 is a photograph of 'AU Gulf Coast Gold' fruit load on vine on a 14-year old grafted plant.

FIG. 8 is a photograph of 'AU Gulf Coast Gold' fruit on 16-year old grafted plant.

DETAILED BOTANICAL DESCRIPTION

Kiwifruit plants are large deciduous shrubs that originated in China and are dioecious, can climb up to 25 feet, and have alternated, broadly rounded petiolate leaves. The cream-colored flowers that grow in axillary cymes mature into ovate to oblong fruits (berries) with brownish, hairy skins. There are over 50 species in the genus *Actinidia*. The two *Actinidia* species of the most commercial importance are *deliciosa* and *chinensis*. The kiwifruit plant is dioecious thereby requiring male pollenizers in the presence of the female plants to ensure fruit production. The male and female plants bloom period has to be at the same time for pollination to occur. The bloom period varies with each cultivar depending upon the chilling requirement and the growing degree hour requirement after the chilling requirement has been met. *Actinidia* are temperate zone plants that prefer well-drained moist and rich soil and grows well in full sun or part-shade.

The new cultivar 'AU Gulf Coast Gold' is pistillate, with imperfect flowers, e.g. the flowers produce only sterile pollen and thus require a pollenizer for fruit production. The male cultivars 'AU Tiger' (patented) and 'Chieftain' (unpatented) are pollenizers used with 'AU Gulf Coast Gold'. The bloom period of 'AU Gulf Coast Gold' starts about April 18th in central Alabama, typically ~2 days before the 'AU Golden Sunshine' (patented) bloom period.

The new cultivar can be asexually reproduced by soft-wood and hardwood cuttings or by grafting onto a seedling or cutting grown rootstock. The unique characteristics come true to form and are established and transmitted through succeeding asexual propagations.

‘AU Gulf Coast Gold’ is a bud mutation that occurred on a ‘AU Golden Sunshine’ (U.S. Plant Pat. No. 22,159) plant in a kiwifruit cultivar evaluation planting at Fairhope, Baldwin County, Ala. Based on the genetic marker comparison of ‘AU Golden Sunshine’ (patented) and ‘AU Gulf Coast Gold’, the genetic distinction between these two cultivars is strong (Table 1).

TABLE 1

Genetic marker comparison of ‘AU Golden Sunshine’ (patented) and ‘AU Gulf Coast Gold’ ^z .				
Variety	554 ^y	559 ^x	565 ^w	566 ^v
AU Golden Sunshine	142, 152^u, 162, 164	131, 163	95 ,107	84 ,86, 88 ,102
AU Gulf Coast Gold	150, 152, 162, 164	131, 163 ,172	88,93, 95 ,98	84,88 ,92,100

^zDNA was extracted from leaf tissue. PCR was performed by using 4 SSR (microsatellite) markers. Capillary electrophoresis was performed using ABI3100 Genetic Analyzer. Data was analyzed using GeneScan and Genotyper.
^yMarker 554 - UDK96-026
^xMarker 559 - UDK96-037
^wMarker 565 - UDK97-406
^vMarker 407 - UDK97407
^uCommon alleles in bold type for both varieties.

‘AU Gulf Coast Gold’ fruit has high percent soluble solids and dry matter typically higher than ‘AU Golden Sunshine’ (patented) and comparable to slightly lower than ‘Hort 16A’ *A. chinensis* (U.S. Plant Pat. No. 11,066) (Table 2).

TABLE 2

Harvest date ^z and fruit quality ^y attributes at harvest of three <i>Actinidia chinensis</i> Planch. var. <i>chinensis</i> cultivars grown in central Alabama.						
Cultivar	2014 Harvest Date	2015 Harvest Date	Firmness (kg)	Soluble Solids (%)	Dry Matter (%)	Internal Color (hue°)
‘AU Golden Sunshine’	Sept. 4	Aug. 25	5.5 ± 1.8	8.2 ± 2.3	17.9 ± 0.012	103.1 ± 2.5
‘AU Gulf Coast Gold’	Sept. 25	Sept. 21	4.6 ± 0.9	8.4 ± 0.8	21.2 ± 0.007	102.9 ± 2.7
‘HORT 16A’	Oct. 9	Oct. 19	5.2 ± 1.0	12.9 ± 3.0	22.2 ± 0.007	103.6 ± 2.9

^zHarvest date for each cultivar was based primarily on an internal color of <104 hue°.
^yMeans derived from 10 fruit/year at specified harvest date.

‘AU Gulf Coast Gold’ bloom period begins 1-2 days before ‘AU Golden Sunshine’ (patented), and is completed 2 days before ‘AU Golden Sunshine’ (patented) bloom period (Table 3).

TABLE 3

Flower development of ‘AU Golden Sunshine’ (patented) and ‘AU Gulf Coast Gold’ in 2009, 2010, and 2016.						
2009						
Cultivar	Apr. 17	Apr. 20	Apr. 24	Apr. 27	Apr. 29	May 1
AU Golden Sunshine	Bud swell	Popcorn Stage	10-30% Bloom	Full Bloom	10-40% Petal Fall	Petal Fall
AU Gulf Coast Gold	Buds Cracking	Popcorn Stage	20-50% Bloom	Full Bloom	60-80% Petal Fall	Petal Fall

TABLE 3-continued

Flower development of ‘AU Golden Sunshine’ (patented) and ‘AU Gulf Coast Gold’ in 2009, 2010, and 2016.						
2010						
	Apr. 21	Apr. 23	Apr. 26	Apr. 28	Apr. 30	May 3
AU Golden Sunshine	Bud swell	Popcorn Stage	80% Bloom	90% Bloom	Full Bloom	Petal Fall
AU Gulf Coast Gold	Popcorn Stage	50% Bloom	70-100% Bloom	Full Bloom	Some Petal Fall	Petal Fall
2016						
	Apr. 17	Apr. 21	Apr. 25	Apr. 27		
AU Golden Sunshine		Popcorn Stage	30-40% Bloom	80% Bloom		Petal Fall
AU Gulf Coast Gold		10-% Bloom	40-50% Bloom	Full Bloom		Petal Fall

The average plant height and spread for ‘Au Gulf Coast Gold’ was limited by pruning the plants and training them to a limited space of 8'x16' on top of trellis. The remaining botanical information is provided below in Table 4.

TABLE 4

Botanical description of ‘AU Gulf Coast Gold’ and comparison to ‘AU Golden Sunshine’	
	‘Gulf Coast Gold’
	‘Golden Sunshine’
PLANT	
Plant hardiness	Has performed well in zones 8A & 8B
Plant: sex expression	female (flower imperfect)
Plant: ploidy	diploid (2n = 2x = 58)
Plant: vigor	strong
Young shoot: hairs	present
Young shoot: density of hairs	medium
Young shoot: type of hair	short
Young shoot: anthocyanin coloration of growing tip	absent (stem color - 152B)
Young shoot: anthocyanin coloration of leaf axil	absent (stem color - 152B)
Insect pest susceptibility	White peach scale (<i>Pseudaulacas pispentagona Targioni</i>) leaffooted bug (<i>Leptoglossus phyllopus Linnaeus</i>)
Diseases	None observed
STEM	
Stem: coloration of leaf axil	Grey-brown, N199A
Stem: diameter	medium
Stem base diameter	mean 12.9 mm (range 9.5-18.3 mm) [20]
Stem mid section diameter	mean 9.9 mm (range 7.3-12.7) [20]
Stem: dormant bud diameter	4.3 mm (2.4-6.0) [20]

TABLE 4-continued

Botanical description of ‘AU Gulf Coast Gold’ and comparison to ‘AU Golden Sunshine’		
	‘Gulf Coast Gold’	‘Golden Sunshine’
Stem: color on upper side of shoot	Grey-brown (N199B)	grey-brown (N199A)
Stem: character of bark	smooth	
Stem: hairs	few	
Stem: conspicuous-ness of lenticels	weak	
Stem: number of lenticels	few	
Stem: color of lenticels	greyed-orange (N-167A)	brownish-white
Stem: size of bud support	large	
Stem: visibility of bud (dormant canes)	visible	
Stern: number of hairs visible on bud (dormant canes)	high	
Stem: leaf scar	mean length 6.1 mm (5.8-7.2 mm) mean width 5.6 mm (5-6.5 mm)	mean length 5.5 mm (4.7-5.9 mm) mean width 5.7 mm (5-6.3 mm)
LEAF (Mature)		
Leaf shape:	orbicular to broadly ovate: as broad as long, occasionally broader than long	broadly cordate to orbicular
Leaf base shape:	round to cordate, with lobes touching to occasionally overlapping; rarely broadly rounded, usually with acute to acuminate tip, rarely with 3 broad, shallow lobes	rounded to cordate; lobes not overlapping
Leaf tip shape:		broadly obtuse with cuspidate tip
Leaf margin:	entire	
Leaf adaxial surface:	yellow green, dull (147A); glabrous except for minute hairs along midvein	medium to dark green (147A); glabrous except for sparse unbranched hairs along veins
Leaf abaxial surface:	yellow green (147B); densely stellate pubescent except on mid-vein which has minute, reddish-brown, crinkled non-branching hairs	light green (147B); dense, stellate pubescence everywhere except along main veins which are densely tomentose tomentose with unbranched hairs
Leaf length (cm):	22.6 (18.0-28.5) [20]	20.1 (16.8-24.1)
Leaf width (cm):	12.7 (10.2-17.5) [20]	15.3 (13.1-18.2)
Leaf ratio (l/w):	1.8 (1.3-2.5) [20]	1.3 (1.2-1.5)
Leaf petiole length (cm):	10.7 (6.6-15.4) [20]	6.4 (5-8.7)
Leaf 1° vein organization:	pinnate; veins terminating as a small points extended beyond the blade (minutely apiculate), to 1.2 mm in length	pinnate; veins terminating as small extended points or mucros at leaf margins
Leaf 2° vein organization:	± parallel	
Leaf puckering:	medium	weak
Leaf variegation	none	
Leaf spines on lower leaf	none	
Leaf surface	none	
Leaf petiole	none	
Young shoot hairs	present	
Young shoot::density of hairs	medium	
Young shoot::type of hairs	short	
Young shoot::antho-cyanin color	absent	

TABLE 4-continued

Botanical description of ‘AU Gulf Coast Gold’ and comparison to ‘AU Golden Sunshine’		
	‘Gulf Coast Gold’	‘Golden Sunshine’
FLOWER		
Inflorescence type	dichasium	
Inflorescence #:	mean 1.6 (range 1-3) [20]	mean 2.2 (range 1-3) [32]
1° Pedicel length (cm):	mean 2.8 (range 1.8-3.9) [20]	3.7(2.5-4.6) [16]
2° Pedicel length (cm):	mean 1.5 (range 1.2-2.1) [20]	1.8 (1.4-2.1) [14]
Pedicel pubescence:	minutely short, dense, unbranched	minutely, densely tomentose;
Sepal #:	mean 6.1 (range 5.0-7.0) [20]	unbranched 5.7 (5-8) [26]
Sepal color:	yellow green (147A) to greyed orange (166C) along margin	gray-green to slightly rust-colored at margins
Sepal pubescence:	dense, minutely tomentose with rusty brown crinkled hairs	minutely, densely tomentose, unbranched
Flower per inflorescence	mean 3.4 (range 3-5) [20]	
Flower color:	creamy white (155D)	
Flower width (cm):	mean 4.2 (range 1.6-4.8)	5.0 (4.8-5.8) [14]
Petal orientation:	overlapping	distinct to overlapping
Petal #	mean 6.2 (range 5.0-8.0) [20]	6.4 (5-9) [17]
Petal length (cm):	mean 2.0 (range 1.8-2.4) [20]	2.1 (1.7-2.5) [2]
Petal width (cm):	mean 1.7 (range 1.3-2.0) [20]	1.6 (1.4-2.1) [20]
Petal ratio (l/w):	mean 1.2 (range 1.0-1.4) [20]	1.3 (1.0-1.6)[20]
Ovary shape:	globose	
Ovary pubescence:	white, densely lanose, thicker toward apex	minutely, densely pilose; unbranched
Style #:	mean 24.4 (range 19-31)[20]	20 (17-22)
Style orientation:	spreading to upright	upright to spreading
Stamen #:	mean 40.9 (range 36-49) [20]	85.4 (80-96)
Anther length (mm):	mean 3.3 (range 2.5-3.6) [20]	3.0-4.0
Chilling requirement hrs:	700	
FRUIT		
Fruit: average size (g)	96.8 (47.7-149.6)	90.4 (47.9-147.0)
Fruit: length (mm)	71.5 (52.1-82.0)	66.8 (51.9-80.3)
Fruit: width (max) (mm)	48.3 (38.4-62.8)	48.4
Fruit: L/A ratio (max width)	1.48	1.38
Fruit: width (min) (mm)	45.1 (34.2-50.1)	44.7
Fruit: LID ratio (min width)	1.59	1.49
Fruit: core diameter (max) (mm)	14.1 (3.1-20.5)	14.3 (3.2-21.7)
Fruit: core diameter (max) (mm)	5.1 (2.3-11.5)	5.6 (2.7-12.7)
Fruit: locule number (30-40)	36.1 (31-40)	36.8
Fruit: peduncle length (mm)	27.1 (19.7-31.7)	28.7 (21.6-34.2)
Fruit: peduncle width (mm)	2.32 (1.8-2.7)	1.7 (1.2-2.6)
Fruit: general shape	cylindrical	

TABLE 4-continued

Botanical description of ‘AU Gulf Coast Gold’ and comparison to ‘AU Golden Sunshine’		
	‘Gulf Coast Gold’	‘Golden Sunshine’
Fruit: cross-section at median	round to rarely slightly compressed	round
Fruit: general shape of stylar end	rounded to somewhat pointed	rounded
Fruit: shape of shoulder on stalk end	rounded, narrow	rounded, flat
Fruit: skin color at harvest	grey-brown dark side N199B, light side N199D	brown
Fruit: skin color change during ripening	grey-brown, dark side N199B, light side N199D	absent
Fruit: skin color at maturity for consumption	grey-brown (N199A)	brown
Fruit: hairs	present	
Fruit: density of hairs	medium	light
Fruit: type of hairs	lanulose (minutely wooly)	tomentose
Fruit: hair length (mm)	short (to 1.0 mm)	short (0.05-0.15)
Fruit: concentration of hairs	uniform to slightly concentrated distally	uniform
Fruit: adherence of hairs to skin (when rubbed)	strong	weak
Fruit: core diameter (at largest diameter)	10 mm (short diameter = 4.5 mm)	large (10.0 mm by 3.4 mm)
Fruit core shape (in cross-section)	round to elliptical	elliptical
Fruit: core woody spike	present	
Fruit: prominence of core woody spike	medium	
Fruit: outer pericarp color at maturity for consumption	yellow green (153C)	yellow-green (152C-152D)
Fruit: inner pericarp color (locules) at maturity for consumption	yellow green (153C to 153D)	yellow-green (148A)
Fruit: core color at maturity	greyed yellow (160C)	
Fruit: seed color at maturity in flesh	N200A, dark brown	brown (165C)
Fruit: seed color when dry	greyed orange 165A	
Fruit sweetness	high	
Fruit acidity	medium	
Storage:	successfully stored for 4 months at 33° F.	
Color Chart RHS Colour Chart: The Royal Horticulture Society, London 2001		
Outer Pericarp	153C	
Inner Pericarp	153D	
Fruit Core at Harvest	160C	
Seed Color (in flesh)	200A	
Seed Color (dry seed)	165A	
Fruit skin at maturity	N199A	
Leaf Color:		
Mature leaf after petal fall		
Upper side of leaf	147A	
Lower side of leaf	147B	

TABLE 4-continued

Botanical description of ‘AU Gulf Coast Gold’ and comparison to ‘AU Golden Sunshine’		
	‘Gulf Coast Gold’	‘Golden Sunshine’
Flower petals:		
Main body of petal	155D	
Plant stem:		
Exposed side	N199A	

Notes regarding Table 4:

1. Horticulture terminology is used in accordance with revised UPOV guidelines for kiwi.

2. Characters of comparison cultivar ‘AU Golden Sunshine’ are noted opposite that character when significantly different.

3. ‘AU Golden Sunshine’ plants were observed in the same experimental planting as the new cultivar.

4. All dimensions are in millimeters unless otherwise stated; weights are in grams.

5. The R.H.S. 2001 Color Chart used to determine actual color.

6. The numbers in brackets, e.g., after any reported number is the number of total measurements made. The number in parentheses e.g., () is the range of the measurement.

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We claim:

1. A new and distinct variety of *Actinidia chinensis* Planch plant named ‘AU Gulf Coast Gold’ substantially as described and illustrated herein.

* * * * *

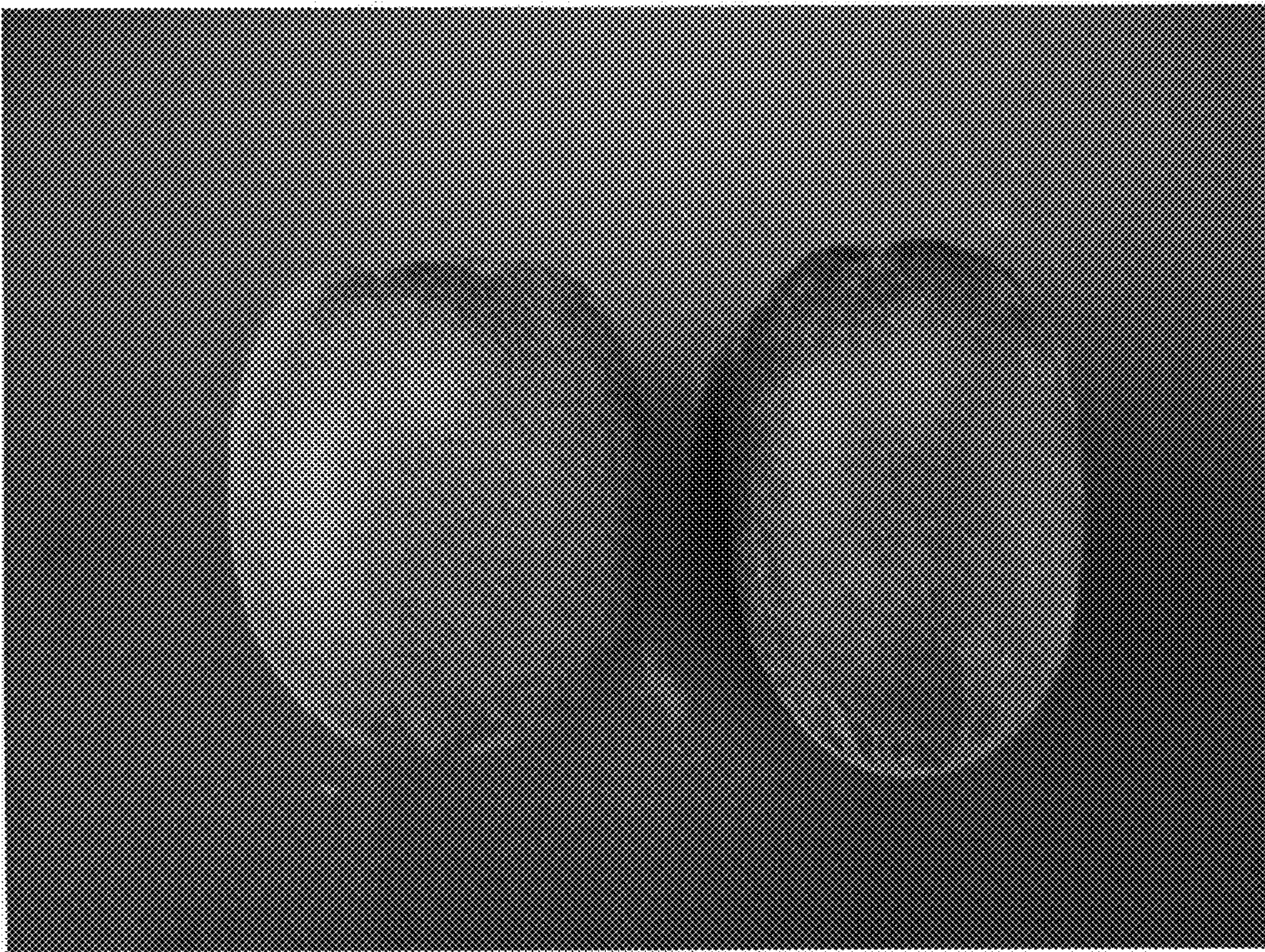


FIG. 1

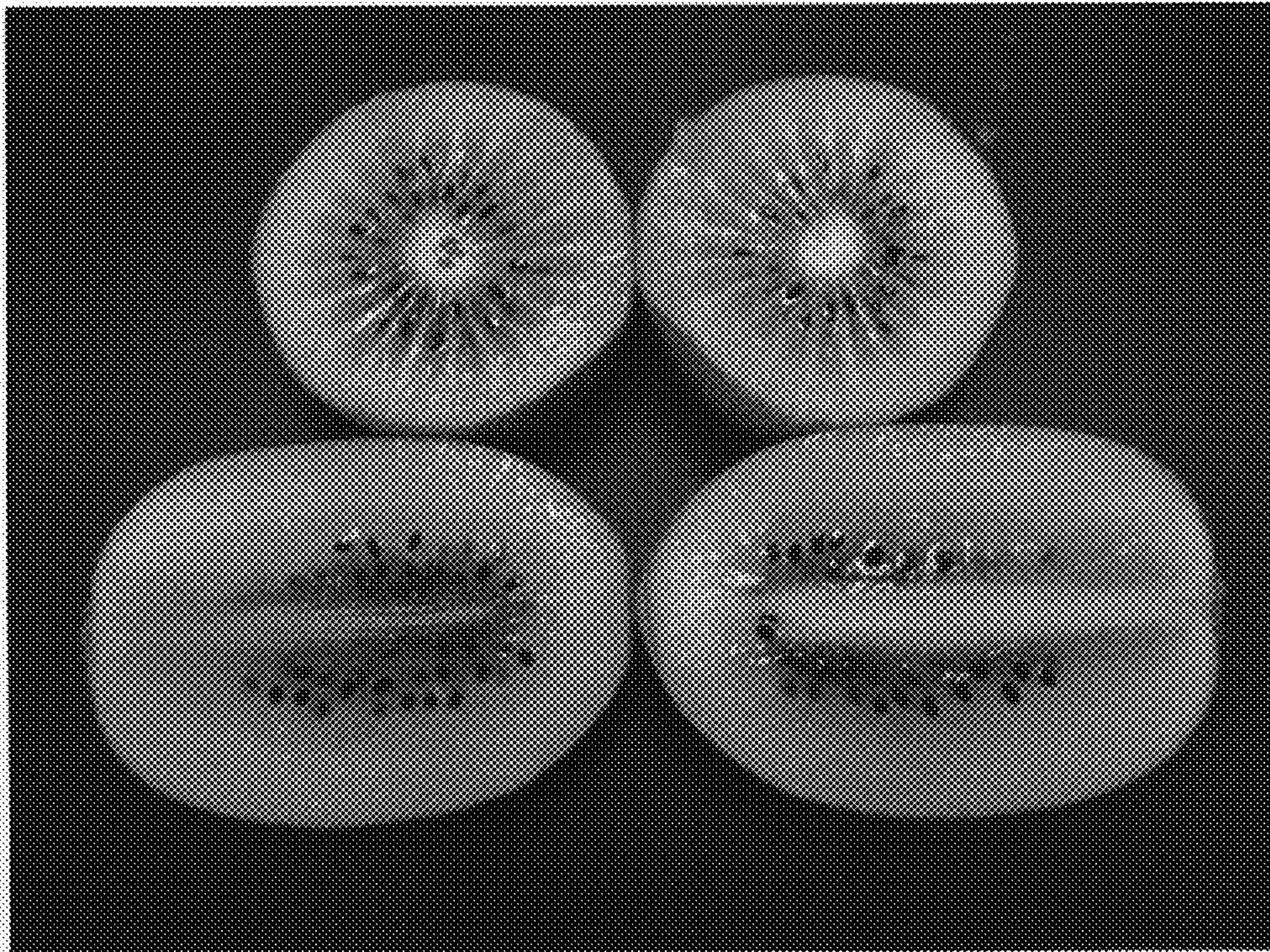


FIG. 2



FIG. 3



FIG. 4



FIG. 5

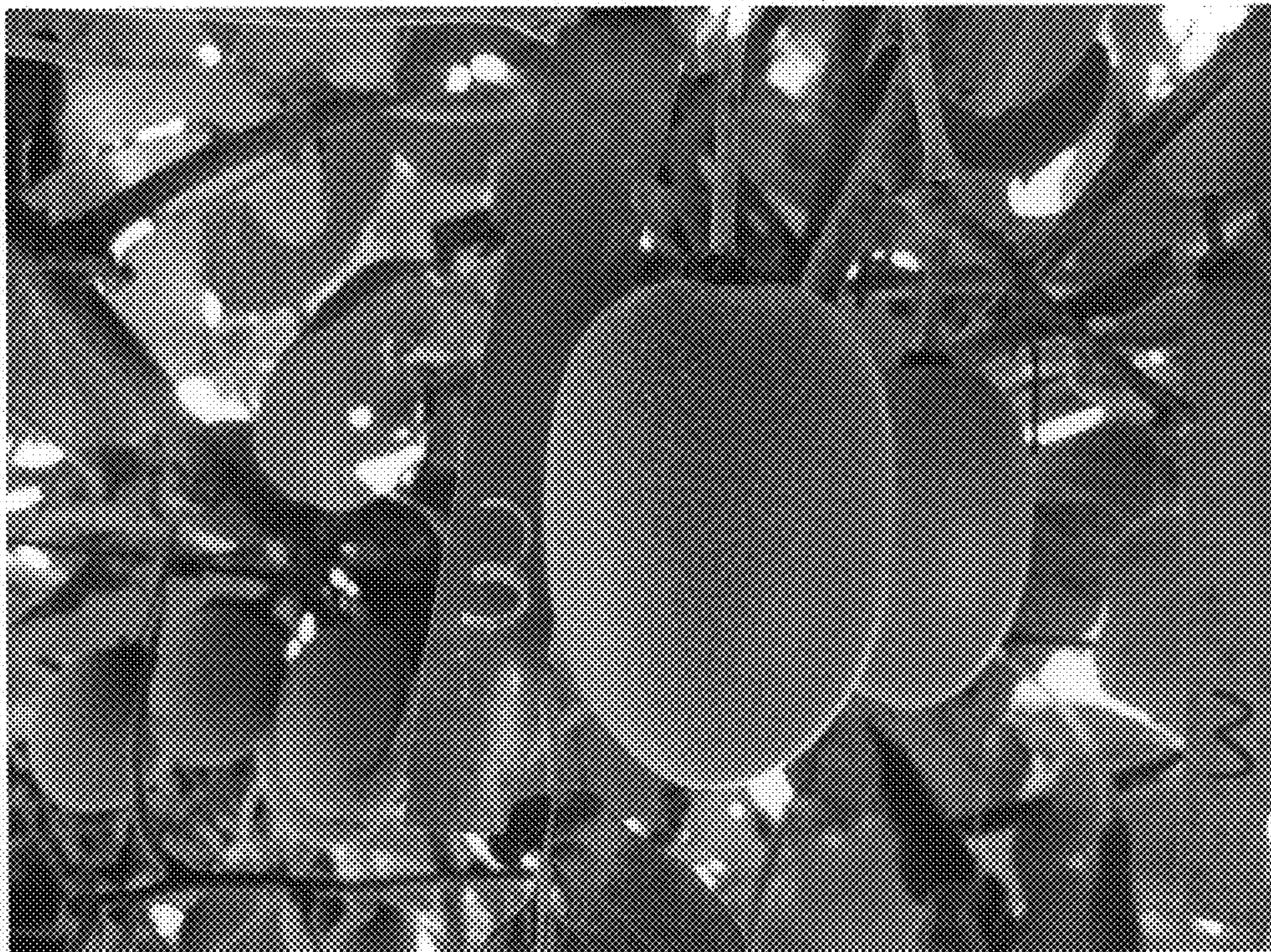


FIG. 6



FIG. 7



FIG. 8