

Señora Jefe  
División de Nuevas Creaciones  
Superintendencia de Industria y Comercio  
E. S. D.

40 40  
SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO



No. 06-122980- -00003-0000

Fecha: 2008-06-27 14:50:03 Dep. 2020 NUECREACIONE  
Tra. 2 PATENTES Eve: 1 REGDEPOSITO  
Act. 538 PETICION Folios: 2

Referencia: Solicitud de privilegio para patente de invención  
Título: Secador de pelo halógeno  
Expediente No. 06-122.980  
Solicitante: Duna Enterprises S.A.  
Asunto: Pago del examen de patentabilidad.

MONICA WOLF WASSERMAN, identificada con cédula de ciudadanía No. 51'711.267 de Bogotá y con Tarjeta Profesional de Abogado No. 46.034 del Consejo Superior de la Judicatura, como apoderada de la sociedad DUNA ENTERPRISES S.A., por medio de la presente me permito allegar el recibo de consignación que respalda el pago del examen de patentabilidad, para la patente de invención identificada en la referencia, a efectos de que ese Despacho proceda a la práctica del mismo.

#### ANEXOS

Recibo de consignación N°. 08- 51789 por la suma de cuatrocientos veinte mil pesos m/cte (\$420.000).

#### NOTIFICACIONES

Recibiré notificaciones en la Secretaría de ése Despacho y en mi oficina, ubicada en la calle 83A No. 23-90 de esta ciudad.

De la Señora Jefe,

MÓNICA WOLF WASSERMAN  
C.C. No. 51.'711.267 de Bogotá  
T.P.A. 46.034 del C. S. de la J.

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41

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO

NIT : 800176089-2

RECIBO OFICIAL DE CAJA : 08 - 51,789  
FECHA : JUNIO 27 DE 2008

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO



No. 06-122980- -00003-0000

Fecha: 2008-06-27 14:50:03 Dep. 2020 NUECREACIONE  
Tra. 2 PATENTES Eve: 1 REGDEPOSITO  
Act. 538 PETICION Folios: 2

## \*\*\*\*\* CONSIGNACION \*\*\*\*\*

| DEPOSITANTE             | TIPO PAGO    | BANCO           | CUENTA    | No. PAGO | FECHA PGO  | Vr. PAGO     |
|-------------------------|--------------|-----------------|-----------|----------|------------|--------------|
| WOLF ABOGADOS ASOCIADOS | CONSIGNACION | BANCO DE BOGOTA | 062754387 | 433484   | 27/06/2008 | 2,118,000.00 |

## \*\*\*\*\* CONCEPTO \*\*\*\*\*

| CANT. | RENTISTICO  | CONCEPTO                             | TOTAL CONCEPTO |
|-------|-------------|--------------------------------------|----------------|
| 1     | 50005-01-01 | SOLICITUDES                          |                |
|       |             | 85 EXAMEN DE PATENTABILIDAD DE INVEN | 420,000.00     |
|       |             | TOTAL :                              | \$ 420,000.00  |

SOL: CUATROCIENTOS VEINTE MIL PESOS

RESPONSABLE :

RECIBO DE CAJA APLICADO AL EXPEDIENTE No. \_\_\_\_\_

**DIVISIÓN DE NUEVAS CREACIONES**

RADICACIÓN EXPEDIENTE No. 06-122980

EL EXTRACTO DE LA PRESENTE SOLICITUD DE **PATENTE DE INVENCION**

FUE PUBLICADO EN LA GACETA DE PROPIEDAD INDUSTRIAL No **584** DE

FECHA **31 DE DICIEMBRE DE 2007** EL TÉRMINO HÁBIL SEÑALADO POR LA

LEY EXPIRA EL **31 DE MARZO DE 2008**

NOTA: Dentro del plazo de los seis (6) meses siguientes a partir de la fecha de publicación en la gaceta de Propiedad Industrial, deberá solicitar y cancelar el examen de patentabilidad so pena de que la solicitud caiga en abandono, de acuerdo con lo establecido en el Artículo 44 de la Decisión 486/2000.

SE PRESENTARON OPOSICIONES POR PARTE DE TERCEROS.

SI \_\_\_\_\_

NO       X

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO  
DIRECCIÓN DE NUEVAS CREACIONES

2020  
Bogotá, D.C.,

Abogada  
**Mónica Wolf W.**  
(Apoderada)

|        |            |              |
|--------|------------|--------------|
| ASUNTO | Radicación | 06 - 122 980 |
|        | Trámite    | 002          |
|        | Evento     | 001          |
|        | Actuación  | 430          |
|        | Oficio     | NO 035 16    |
|        | Folios     | 032          |

|                               |                                     |                               |                          |
|-------------------------------|-------------------------------------|-------------------------------|--------------------------|
| Patente de Invención          | <input checked="" type="checkbox"/> | Patente de Modelo de Utilidad | <input type="checkbox"/> |
| Vía Nacional                  | <input type="checkbox"/>            |                               |                          |
| Vía PCT (fase nacional)       | <input type="checkbox"/>            | Cap. I                        | <input type="checkbox"/> |
|                               |                                     | Cap. II                       | <input type="checkbox"/> |
| Solicitud Internacional n.º   |                                     |                               |                          |
| Fecha de Presentación Intrnl. |                                     |                               |                          |

Como resultado del examen de fondo, realizado con fundamento en el artículo 45 de la Decisión 486 de la Comisión de la Comunidad Andina, se le comunica:

**1. Documentos estudiados**

|                          |                                            |
|--------------------------|--------------------------------------------|
| <u>Descripción:</u>      | Folios 14 a 20 como se radicó inicialmente |
| <u>Reivindicaciones:</u> | Folios 21 y 22 como se radicó inicialmente |
| <u>Dibujos:</u>          | Folio 25 como se radicó inicialmente       |

**2. Objeto de la invención**

Título de la solicitud: *Secador de pelo halógeno*, folio 1.

El objeto de la presente solicitud de patente de invención consiste en suministrar un secador de pelo, que además de ser calentado por una resistencia eléctrica, tiene una lámpara halógena dotada de un filamento de carbono, que contribuye a generar calor y produce un tipo de luz benéfico para el cuidado de la piel

El problema planteado en esta solicitud es satisfacer la necesidad de tener un secador que favorezca el cuidado de la piel

Para solucionar este problema técnico la solicitud en estudio proporciona un secador que tiene una resistencia eléctrica, un ventilador y una lámpara halógena que produce un tipo de luz con radiación infrarroja lejana y una controlada emisión de radiación ultravioleta.

Clasificación Internacional de Patentes (IPC): A45D 20/12, 20/00, 1/00, H05B 3/06, 3/16

### 3. De la solicitud de Patente

Antes de entrar en detalles específicos, se le dan al solicitante ciertas indicaciones generales, algunas de las cuales son aplicables a este caso y todas deberán ser tenidas en cuenta en las eventuales modificaciones:

El título o nombre de la invención debe concordar con lo que se reclama en el capítulo reivindicatorio. Esto es, si en las reivindicaciones se reclama un producto, tal producto debe ser mencionado en el título, y si en las reivindicaciones se reclama un procedimiento o un sistema o un método, también debe ser mencionado allí. Normalmente, el título debe contener máximo diez palabras aunque eventualmente pueden ser más. El título no debe contener palabras cuyo significado no esté reconocido dentro del sector de la técnica de que se trate. Preferiblemente, deben ser palabras cuyo significado se encuentre en el Diccionario de la Real Academia Española (DRAE).

En Colombia, la máxima autoridad en cuestiones del lenguaje es la Academia Colombiana de la Lengua. En caso de duda sobre el significado de las palabras, se debe acoger la definición que trae el Diccionario de la Real Academia Española (DRAE).

En Colombia, es de uso obligatorio el Sistema Internacional de unidades. Esto implica, también, que la coma decimal es de uso obligatorio. Cuando aparezca algún valor con unidades diferentes a las exigidas, deberá incluirse su correspondiente conversión al Sistema Internacional.

La parte técnica de la solicitud se divide en tres secciones, debidamente separadas, preferiblemente en este orden: El capítulo descriptivo, el capítulo reivindicatorio y el juego de dibujos o figuras. Ninguna de estas secciones podrá llevar membretes (encabezamientos o pies de página) ajenos al contenido técnico de la solicitud.

Por lo menos el capítulo descriptivo debe estar debidamente paginado y estar escrito a doble espacio, con el fin de facilitar la referencia a los apartados del texto.

La terminología empleada en la descripción y en las reivindicaciones debe ser igual para designar las diferentes partes, piezas, elementos, detalles o aspectos de lo que se mencione en ellas, los cuales, a su vez, deben estar designados con números o signos de referencia.

Dentro del texto de la descripción y las reivindicaciones se aconseja encerrar entre paréntesis el número o signo de referencia cada vez que se mencione el detalle correspondiente, con el fin de distinguirlo de otros tipos de números o signos que eventualmente aparezcan allí. Estos números o signos de referencia deben aparecer dentro del juego de dibujos (preferiblemente, sin paréntesis, aunque pueden estar encerrados dentro de un círculo) siempre acompañados de líneas o flechas que señalen o indiquen a qué parte, pieza, elemento o aspecto se encuentran asociados.

Las reivindicaciones deben estar numeradas individual y consecutivamente (1, 2, ..., 5, 6, etc.) El capítulo reivindicatorio no debe tener subtítulos. Normalmente se pueden encontrar dos categorías de reivindicaciones: una la de producto y la otra, de procedimiento.

En las reivindicaciones se deben definir los alcances de la protección que desea el solicitante. En consecuencia, las reivindicaciones forman un cuerpo aparte de la descripción y como tal debe ser redactado: la primera vez que se mencione un nombre dentro de las reivindicaciones debería estar acompañado de un artículo indeterminado; y, la inclusión -entre paréntesis- de un número de referencia no sustituye la definición del elemento o aspecto al que se refiere, simplemente sirve de información complementaria. Se debe entender que la descripción sirve para interpretar las reivindicaciones y, en consecuencia, si en una reivindicación se reclama un aparato, por ejemplo, no se deberían mencionar aspectos del funcionamiento del aparato dentro de la reivindicación, limitándose a definir únicamente los elementos que constituyen el aparato.

Cada una de las figuras debe estar debidamente identificada, preferiblemente con un número consecutivo: Figura 1, figura 2, ...

Las figuras deben ser realizadas siguiendo las reglas del dibujo técnico.

Se prefiere que dentro de las figuras no se incluya ningún texto. Cada uno de los detalles ilustrados en las figuras deberá estar señalado con un número o signo de referencia, el cual será el mismo en todas las figuras en donde se encuentre el detalle en cuestión. Si en alguna figura no se encuentran números de referencia, se entiende que no se va a decir nada sobre ella dentro del texto de la descripción y, entonces, es preferible que se omita tal figura. Análogamente, si en una figura no se encuentra señalado algún detalle con el respectivo número de referencia, es preferible que se omita tal detalle.

La patente de **modelo de utilidad** no puede incluir los procedimientos, por definición. Si alguna de las reivindicaciones de una solicitud de patente de modelo de utilidad reclama un procedimiento, debe ser suprimida.

#### Descripción (artículo 28 D. 486)

Durante el análisis del texto de la descripción y de las ilustraciones anexadas, se observaron los siguientes defectos:

- 1) El título o nombre de la invención *Secador de pelo halógeno* contiene la expresión *pelo halógeno*. Dado que *halógeno* califica al secador y no al pelo, se sugiere sustituir el título por *Secador halógeno de pelo* u otra expresión que se ajuste mejor a lo que el solicitante quiere decir.
- 2) La misma expresión objetada arriba se encuentra a lo largo de la descripción y en las reivindicaciones, por lo que debe ser corregida allí.
- 3) En la página 3, folio 15, aparece la expresión *...la absorción del Ca y del Ph que son beneficiosos...* en la cual se ignora qué significan los símbolos *Ca* y *Ph*, porque, como no se trata de una invención química, se deben dar los nombres de los compuestos (o elementos) a los cuales se refiere el solicitante.
- 4) En la página 4, folio 16, aparece la expresión *300.000km/seg* que, debe ser escrita como *300 000 km/s*, porque, en primer lugar, los símbolos deben estar separados de los números por un espacio; y, en segundo lugar, el símbolo de la unidad de tiempo, *segundo*, es *s*, no *seg*.
- 5) En la misma página 4 aparece una serie de valores sin los correspondientes símbolos de las unidades; cada valor de un intervalo debe estar acompañado de su respectivo símbolo.

- 6) En la página 5, folio 17, aparece la expresión *carbonato de tungsteno (WC)* en la cual lo expresado en palabras no corresponde a lo expresado en símbolos: WC corresponde a *carburo de tungsteno*. El solicitante debe hacer las correcciones pertinentes para que lo expresado en palabras coincida con lo expresado en símbolos.
- 7) En la página 7, folio 19, aparece la expresión *calefactor de halógena* que carece de sentido.
- 8) En la misma página 7 aparece la expresión *...filamen- // to(no visible // en las figuras) es de carbono*. En la cual no están justificados los saltos de líneas.
- 9) En la misma página 7 aparece la expresión *el punto medio del resistor se conecta en el terminal extremo -5-... una bornera -8- ubicada en un extremo opuesto de una de las placas -1-* en la cual no está muy clara la descripción, porque el extremo (5) está sobre una placa -la cual tiene solo un extremo opuesto, *el extremo opuesto-*. La oposición de que se habla puede interpretarse como el extremo de la otra placa que ocupa una posición ortogonal respecto al terminal (5) o como el otro extremo de esta placa. Incidentalmente, se le sugiere al solicitante que encierre entre paréntesis los números de referencia que se citan dentro del texto.
- 10) La descripción no es suficientemente completa como para que un tercero pueda ejecutarla. Concretamente, no se mencionan los valores de las resistencias eléctricas ni la potencia de la lámpara halógena que pueden utilizarse con el objeto de la solicitud. No se detallan los circuitos eléctricos pertinentes. Tampoco se menciona la ubicación ni las características del ventilador que presumiblemente debe tener el secador.

La descripción no cumple con los requisitos de claridad y divulgación completa, lo que dificulta o impide su comprensión y ejecución de acuerdo al Art. 28 de la Decisión 486.

#### Reivindicaciones (artículo 30 D 486)

Durante el análisis del texto de las reivindicaciones se observaron los siguientes defectos:

- 1) El capítulo reivindicatorio, al comienzo, folio 21, contiene un párrafo que debe ser suprimido, en aras de la concisión.
- 2) En la reivindicación 1, folio 21, aparece por primera vez en el capítulo reivindicatorio la expresión *pelo halógeno* que debe ser corregida. Esta reivindicación carece de definición por esta causa.
- 3) En la misma reivindicación 1 aparece la expresión *...del tipo integrado por... un soporte integrado por un par de placas montadas en cruz, caracterizado porque en dicho soporte de material dieléctrico incombustible...* en donde se desconoce a qué *soporte de material dieléctrico incombustible* se refiere porque no se ha mencionado antes dentro del capítulo reivindicatorio. Esta reivindicación carece de definición por esta causa.
- 4) En la misma reivindicación 1 aparece la expresión *... portador del resistor calefactor, en el cual están definidos espacios en ángulo diedro delimitados por las dos placas cruzadas ortogonalmente que lo integran...* que, por una parte, no coincide con lo divulgado en la solicitud, porque el *resistor calefactor* no tiene definidos ningunos *espacios* -esta reivindicación carece de sustento por dicha causa-; y, por otra parte, no se han mencionado antes ningunas *placas cruzadas ortogonalmente*, solo se mencionaron *placas montadas en cruz* que es distinto. Esta reivindicación carece de definición por esta causa. El solicitante debe unificar la terminología que utiliza a lo largo de la solicitud.

Debe entenderse que las reivindicaciones dependientes de la reivindicación objetada son, asimismo, objetadas, por razones análogas.  
Las reivindicaciones no cumplen con los requisitos de definición, claridad, concisión o sustento por la descripción de acuerdo al Art. 30 de la Decisión 486.

Se deben presentar, entonces, nuevos capítulos descriptivo y reivindicatorio, ambos completos, junto con un nuevo juego de dibujos, donde se hayan corregido todas las objeciones que se han hecho arriba. Esto con el fin de evitar -cuando solo se presentan algunas páginas sueltas corregidas- que el lector tenga que desplazarse desde un sitio a otro de la solicitud y luego regresar a donde estaba antes sin perder la ilación de la lectura, porque esto produce confusión y afecta negativamente la claridad de dichos capítulos.

Se le advierte al interesado que las modificaciones sugeridas arriba podrían resultar inconducentes si se mantienen las objeciones a la patentabilidad que se insinúan adelante.

4. Determinación del Estado de la Técnica

La fecha que se ha tenido en cuenta para determinar el Estado de la Técnica es la

Fecha de presentación de la solicitud nacional: 2006-12-06

Se realizó la búsqueda en el estado de la técnica de documentos relacionados con la solicitud teniendo en cuenta la fecha indicada; y durante la búsqueda de anterioridades se encontraron los siguientes documentos, que forman parte de la familia de patentes de la presente solicitud: Publicación US 2008/0172900 A1 del 2008-07-24; publicación FR 2 910 250 A1 del 2008-06-27; y publicación ES 2 302 456 A1 del 2008-07-01. Se anexa la copia de las primeras páginas de estos documentos junto con la copia: del rechazo final, fechado el 08-01-24, por parte de la USPTO (US); del Informe de Búsqueda Preliminar del INPI (FR); y el Informe sobre el Estado de la Técnica de la OEPM (ES). También se encontraron los siguientes documentos que forman parte del estado de la técnica más cercano al objeto de la solicitud:

| n.º | Documento                                                                                                                               | Título                                                                                                                                                                     | Fecha de publicación |
|-----|-----------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| D1  | Patente US 4 032 809, cuyo inventor es Richard Corth, quien le cedió sus derechos a la Westinghouse Electric Corporation                | «Tantalum carbide or tantalum-alloy carbide filament mounting and method»(Un montaje de filamento de carburo de tantalio o de carburo de aleación de tantalio y el método) | 1977-06-28           |
| D2  | Patente US 4 230 933, cuyos inventores son Dov Z. Glucksmann y Karl H. weidermann, quienes le cedieron sus derechos a Dov Z. Glucksmann | «Electric air heating element»(Un elemento para calentamiento eléctrico de aire)                                                                                           | 1980-10-28           |
| D3  | Patente US 6 285 828 B1, cuyo inventor es Michael Cafaro, quien le cedió sus derechos a Helen of Troy                                   | «Infrared hair dryer heater»(Un secador calentador infrarrojo de cabello)                                                                                                  | 2001-09-04           |
| D4  | Patente US 6 378 225 B1, cuyo inventor es Fred M. Slingo                                                                                | «Hair dryer employing far-infrared radiation»(Un secador de cabello que emplea radiaciones del infrarrojo lejano)                                                          | 2002-04-30           |



| n.º | Documento                                                                                                                                                                                                                                                                                        | Título                                                                                                                                                   | Fecha de publicación |
|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
|     | Publicación                                                                                                                                                                                                                                                                                      |                                                                                                                                                          |                      |
| D5  | US 2002/0173780 A1, cuyos inventores son Gregory B. Altshuler, Mikhail Inochkin, Valery Y U Khramov, Sergey B. Biruchinsky, Andrei V. Erofeev y Andrei V. Belikov. Patente ES 2 177 285 T3, cuyo inventor es Kyong Young Yune, quien le cedió sus derechos a la Shing Heung Engineering Co. Ltd. | «Apparatus and method for photocosmetic and photodermatological treatment»(Un aparato y un método para el tratamiento fotocosmético y fotodermatológico) | 2002-11-21           |
| D6  | Young Yune, quien le cedió sus derechos a la Shing Heung Engineering Co. Ltd.                                                                                                                                                                                                                    | «Secador de cabello halógeno»                                                                                                                            | 2002-12-01           |

Se anexa la copia de las páginas pertinentes de estos documentos

NOTAS: No se realizaron las evaluaciones de los demás requisitos de patentabilidad, porque se hicieron algunas objeciones respecto a la definición, la claridad, la concisión y el sustento por la descripción de las reivindicaciones; esto es, no se pudo practicar un análisis comparativo, por ausencia de materia.

A pesar de lo anterior, con base en los exámenes de la USPTO, del INPI (FR) y de la OEPM y con base en las enseñanzas de los documentos encontrados hasta ahora, se prevén objeciones respecto al nivel inventivo del objeto de la solicitud.

En especial, se señala que el documento D3 es citado independientemente por las tres oficinas (US, FR y ES) para sustentar las objeciones a la patentabilidad. Los documentos D1, D2 y D5 sólo son citados por la USPTO (US); El documento D4 únicamente es citado por el INPI (FR); y, El documento D6 fue citado por la OEPM (ES).

Teniendo en cuenta lo anterior, se le sugiere al solicitante que, si considera que el objeto de la solicitud reúne los requisitos para ello -en especial los determinados por el artículo 81 de la Decisión 486-, cambie la modalidad de su solicitud a patente de modelo de utilidad. De aceptar esta sugerencia, deberá expresarlo así y deberá realizar los ajustes que considere necesarios en el capítulo reivindicatorio para que no se encuentre ninguna objeción previsible -en el momento en que la Oficina examine su solicitud para verificar el cumplimiento de los requisitos, bajo esta nueva modalidad-

Esta sugerencia se hace en concordancia con lo dispuesto en el artículo 35 de la mencionada Decisión.

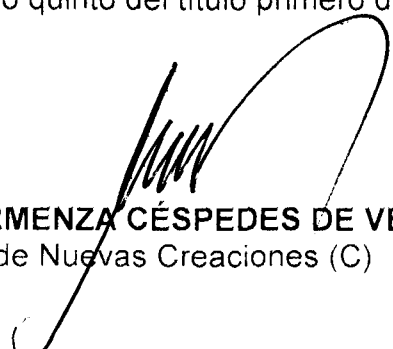
5. Conclusión:

Los requisitos de patentabilidad de la presente solicitud se encuentran afectados negativamente por la falta completitud de la descripción, por la falta de claridad de la descripción y las reivindicaciones y por la falta de definición, de sustento y de concisión de estas últimas.

En cumplimiento del artículo 45 de la Decisión 486 de la Comisión de la Comunidad Andina, se le indica que debe dar respuesta dentro del término de sesenta días contados a partir de la fecha de notificación de la presente comunicación. En caso de no dar respuesta al presente requerimiento, o si a

pesar de la respuesta subsistieran los impedimentos para la concesión, se denegará la patente.

Notifíquese el presente oficio conforme a lo dispuesto en el número 5.2, letra e), del capítulo quinto del título primero de la Circular Única n.º 10 de 2001.



**ALIX CARMENZA CÉSPEDES DE VERGEL**  
Directora de Nuevas Creaciones (C)

El anterior requerimiento fue notificado por fijación en lista, de fecha  
11 MAR. 2010.

**CONCEPTO TÉCNICO n.º 0906**

**EXAMINADOR TÉCNICO**  
Código n.º 202009



US 20080172900A1

(19) **United States**

(12) **Patent Application Publication**

**Ceva**

(10) Pub. No.: **US 2008/0172900 A1**

(43) Pub. Date: **Jul. 24, 2008**

(54) **HALOGEN HAIR DRYER**

**Publication Classification**

(76) Inventor: **Carlos Jose Ceva, Buenos Aires (AR)**

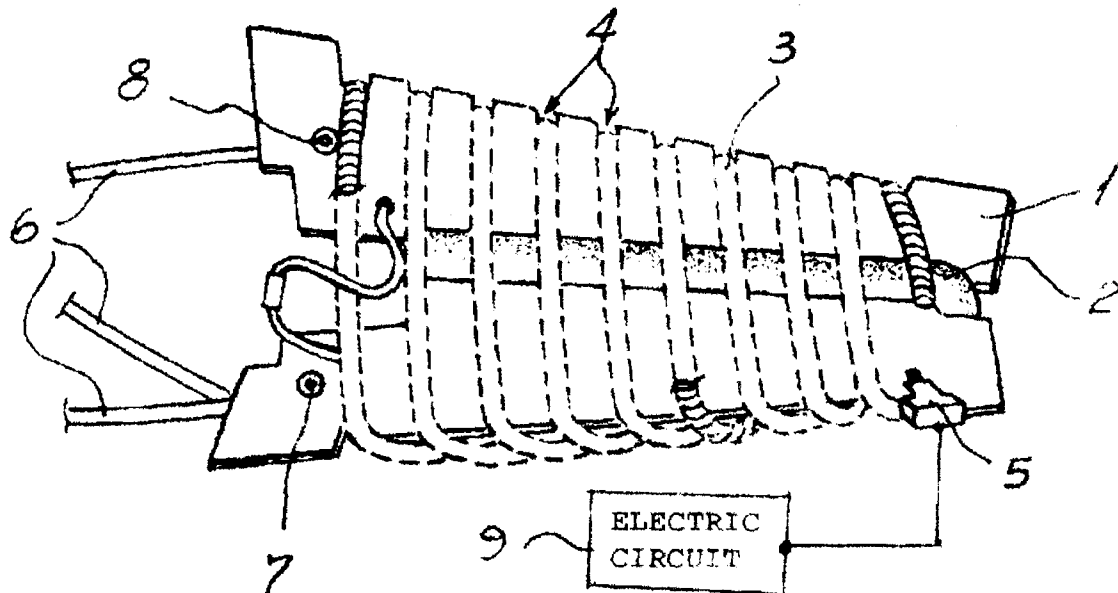
(51) Int. Cl. **A45D 20/08** (2006.01)  
**F26B 3/34** (2006.01)  
(52) U.S. CL. **34/96; 34/266**  
(57) **ABSTRACT**

Correspondence Address:  
**HUGHES HUBBARD & REED LLP**  
**ONE BATTERY PARK PLAZA**  
**NEW YORK, NY 10004**

A halogen hair dryer, which is characterized in that the halogen tube with "U" form, provided with a carbon filament, is mounted within the spaces in dihedral angle opposed by the central vertex and delimited by both of the orthogonally crossed plates which exist in the holder made of non-flammable dielectric material which houses the heating resistor; said halogen tube is arranged so that its arms are parallel to the central axis of the holder and are placed under the spiral layer that forms the heating resistor wound around the notched edges of the holder.

(21) Appl. No.: **11/624,858**

(22) Filed: **Jan. 19, 2007**



51

51

Final Rejection 08-01-24

Application/Control Number:  
11/624,858  
Art Unit: 3742

Page 2

## DETAILED OFFICE ACTION

### Response to Amendment

1. Response to non-final action is acknowledged.

### Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cafaro (US6285828) in view of Altshuler et al, (US2002/0173780), and further in view of Corth (US4032809) and Glucksman et al. (4230933).

With respect to claim 1, Cafaro discloses a halogen hair dryer (200) consisting of a heating element (213) arranged around a holder formed by a pair of plates (Fig. 7) assembled in cross form, having numerous notches on its edges for housing the resistor wound around as a spiral, characterized in that a halogen tube (214) with "U" form filament (Fig. 6), mounted within the spaces in dihedral angle opposed by the central vertex and delimited by both of the orthogonally crossed plates which exist in the said holder and housing the heating element; said halogen tube is arranged so that arms are parallel to the central axis of the holder and placed under the spiral layer that forms the heating element wound around the notched edges of the holder.

With respect to claim 1, Cafaro discloses a halogen tube (214) with "U" form (Fig. 6) filament but does not disclose a halogen tube with "U" form and silent regarding

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material being a carbon filament and crossed plates made of non-flammable dielectric material.

Altshuler et al. (US2002/0173780) relates to apparatus and method for photo cosmetic (see paragraph [0098-0099] for U shape halogen lamp "The lamp 2 in the device shown in FIG. 1 may be a gas discharge lamp based on the inertial gases Xe, Kr, Ne and others, a metal halide lamp, mercury vapor lamp, high pressure sodium lamp, fluorescent lamp, halogen lamp, incandescent lamp etc. The lamp has a linear tube shape.--Other variations include U shape or ring shape. The dimensions of the lamp are chosen on the basis of the device output parameters.").

Corth discloses a halogen lamp with tantalum carbide or tantalum-alloy carbide filament mounting and method.

Gluckman et al. discloses an electric heating element for hair dryer comprising a solid star shaped coil carrier of a non-conductive and heat resistant material (column 1, lines 35-45).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide a halogen lamp with "U" form and with a carbon filament and crossed plates made of non-flammable dielectric material, as evidenced by Altshuler et al., Corth and Glucksman respectively for the hair dryer of Cafaro.

With respect to claim 2, Cafaro discloses halogen tube is independently connected within the dryer circuit as shown in Figure 6.

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Page 4

With respect to claim 3, Cafaro discloses heating element defined by a proper wire spiral, has its midpoint (124B) (Figure 4) connected to a terminal, from where it connects to the control electric circuit.

With respect to claim 4, Cafaro discloses heating element has its ends fixed in terminals at one end of said holder plates but silent regarding being stapled. This is considered as product by process claim. Patentability of a product-by-process claim does not depend on its method of production but is based on the product. "If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985).

Once the Office shows that the claimed product appears to be the same or similar to that of the prior art, although produced by a different process, the burden shifts to applicant to come forward with evidence establishing an unobvious difference between the claimed product and the prior art product. In re Marosi, 710 F.2d 798, 802, 218 USPQ 289, 292 (Fed. Cir. 1983).

#### ***Response to Arguments***

4. Applicant's arguments filed 11/06/07 have been fully considered but they are not persuasive. The examiner respectfully disagree with the applicant with respect to none of the references discloses the carbon filament. Cited prior art Corth (US4032809) discloses "TANTALUM CARBIDE OR TANTALUM-ALLOY CARBON FILAMENT MOUNTING AND METHOD". Carbide is a binary compound of carbon with more

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electropositive element, thus it meets claim limitation. In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). During examination, claim limitations are to be given their broadest reasonable reading. *In re Zletz*, 893 F.2d 319, 321, 13 USPQ2d 1320, 1322 (Fed. Cir. 1989); *In re Prater*, 415 F.2d 1393, 1404-05, 162 USPQ 541, 550-51 (CCPA 1969).

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

SS

⑬ RÉPUBLIQUE FRANÇAISE  
INSTITUT NATIONAL  
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⑫ N° d'enregistrement national : 06 11367

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⑫ DEMANDE DE BREVET D'INVENTION A1

⑭ Date de dépôt : 26.12.06.

⑯ Priorité :

⑰ Demandeur(s) : DUNA ENTERPRISES SA — PA.

⑱ Inventeur(s) : CEVA CARLOS JOSE.

⑲ Date de mise à la disposition du public de la  
demande : 27.06.08 Bulletin 08/26.

⑳ Liste des documents cités dans le rapport de  
recherche préliminaire : Se reporter à la fin du  
présent fascicule

㉑ Titulaire(s) :

㉒ Références à d'autres documents nationaux  
apparentés :

㉓ Mandataire(s) : CABINET VITTOZ.

㉔ SECHE-CHEVEUX HALOGENE.

㉕ Sèche-cheveux, du type comportant par un élément chauffant -3- logé autour d'un support comportant une paire de plaques -1- montées sous la forme de croix, ayant ses arêtes dentées par plusieurs fentes -4- de logement du résistor -3- enroulé sous la forme de spirale, caractérisé en ce que ledit support -1- en matériel diélectrique incombustible, porteur du résistor chauffant -3-, dans lequel des espaces en angle dièdre, sont définis délimités par les deux plaques croisées de manière orthogonale qui le composent, comporte en outre un tube halogène -2- en forme de "U" muni d'un filament d'allumage en carbone et monté à l'intérieur d'une paire desdits dièdres opposés par son arête centrale, les branches dudit tube s'étendant parallèlement à l'axe central du support, en dessous de la couche de spirales qui composent le résistor chauffant -3-, bobiné autour des bords cannelés du support -1-.

FR 2 910 250 - A1

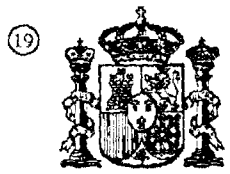




INSTITUT NATIONAL  
DE LA PROPRIÉTÉ  
INDUSTRIELLERAPPORT DE RECHERCHE  
PRÉLIMINAIREétabli sur la base des dernières revendications  
déposées avant le commencement de la rechercheN° d'enregistrement  
nationalFA 688778  
FR 0611367

| DOCUMENTS CONSIDÉRÉS COMME PERTINENTS                                                                                                                                                                                                  |                                                                                                                                          | Revendication(s)<br>concernée(s)                                                                                                                                                                                                                                                                                                          | Classement attribué<br>à l'invention par l'INPI |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|
| Catégorie                                                                                                                                                                                                                              | Citation du document avec indication, en cas de besoin,<br>des parties pertinentes                                                       |                                                                                                                                                                                                                                                                                                                                           |                                                 |
| X                                                                                                                                                                                                                                      | US 6 285 828 B1 (CAFARO MICHAEL [US])<br>4 septembre 2001 (2001-09-04)<br>* le document en entier *                                      | 1-4                                                                                                                                                                                                                                                                                                                                       | A45D20/12                                       |
| A                                                                                                                                                                                                                                      | WO 00/00055 A (PARK CHUL YONG [KR]; SHIN<br>HEUNG ENGINEERING CO LTD [KR]; YUNE KYONG<br>YO) 6 janvier 2000 (2000-01-06)<br>* figure 2 * | 1                                                                                                                                                                                                                                                                                                                                         |                                                 |
| A                                                                                                                                                                                                                                      | US 847 872 A (ALLEN ISABEL)<br>19 mars 1907 (1907-03-19)<br>* le document en entier *                                                    | 1                                                                                                                                                                                                                                                                                                                                         |                                                 |
| A                                                                                                                                                                                                                                      | WO 96/14776 A (DELL OGLIO ROSARIO [IT])<br>23 mai 1996 (1996-05-23)<br>* page 8, alinéa 1; figure 2 *                                    | 2                                                                                                                                                                                                                                                                                                                                         |                                                 |
| A                                                                                                                                                                                                                                      | DE 23 49 888 A1 (WIGO WIDMANN SOEHNE<br>GOTTLÖB) 17 avril 1975 (1975-04-17)<br>* le document en entier *                                 | 1,3,4                                                                                                                                                                                                                                                                                                                                     |                                                 |
| A                                                                                                                                                                                                                                      | DE 397 010 C (KIKEI NISHIKAWA)<br>14 juin 1924 (1924-06-14)<br>* le document en entier *                                                 | 1                                                                                                                                                                                                                                                                                                                                         | DOMAINES TECHNIQUES<br>RECHERCHÉS (IPC)         |
| X                                                                                                                                                                                                                                      | US 6 378 225 B1 (SLINGO FRED M [US])<br>30 avril 2002 (2002-04-30)<br>* le document en entier *                                          | 1,2                                                                                                                                                                                                                                                                                                                                       | A45D<br>A61N<br>H05B<br>F26B<br>H01K            |
| Date d'achèvement de la recherche                                                                                                                                                                                                      |                                                                                                                                          | Examineur                                                                                                                                                                                                                                                                                                                                 |                                                 |
| 18 mai 2007                                                                                                                                                                                                                            |                                                                                                                                          | Escudero, Raquel                                                                                                                                                                                                                                                                                                                          |                                                 |
| CATÉGORIE DES DOCUMENTS CITÉS                                                                                                                                                                                                          |                                                                                                                                          | T : théorie ou principe à la base de l'invention<br>E : document de brevet bénéficiant d'une date antérieure<br>à la date de dépôt et qui n'a été publié qu'à cette date<br>de dépôt ou qu'à une date postérieure.<br>D : cité dans la demande<br>L : cité pour d'autres raisons<br>& : membre de la même famille, document correspondant |                                                 |
| X : particulièrement pertinent à lui seul<br>Y : particulièrement pertinent en combinaison avec un<br>autre document de la même catégorie<br>A : arrière-plan technologique<br>O : divulgation non-écrite<br>P : document intercalaire |                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                           |                                                 |

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OFICINA ESPAÑOLA DE  
PATENTES Y MARCAS  
  
ESPAÑA

⑪ Número de publicación: **2 302 456**  
⑫ Número de solicitud: 200603235  
⑤① Int. Cl.:  
**A45D 20/12** (2006.01)

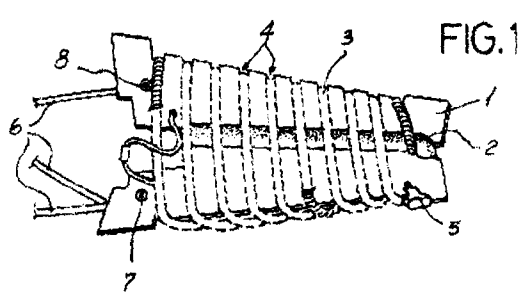
⑫ SOLICITUD DE PATENTE A1

|                                                                           |                                                                                                             |
|---------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|
| ⑫ Fecha de presentación: <b>20.12.2006</b>                                | ⑦① Solicitante/s: <b>DUNA ENTERPRISES S.L.</b><br><b>Gran Vía, 45 - 6 Planta</b><br><b>48011 Bilbao, ES</b> |
| ④③ Fecha de publicación de la solicitud: <b>01.07.2008</b>                | ⑦② Inventor/es: <b>Ceva, Carlos</b>                                                                         |
| ④③ Fecha de publicación del folleto de la solicitud:<br><b>01.07.2008</b> | ⑦④ Agente: <b>Gallego Jiménez, José Fernando</b>                                                            |

⑤④ Título: **Secador halógeno de pelo.**

<070

⑤⑦ Resumen:  
Secador halógeno de pelo.  
El soporte de material dieléctrico incombustible, portador del resistor calefactor, con espacios definidos en ángulo diedro delimitados por las dos placas cruzadas ortogonalmente que lo integran, está montado en el interior de un par de dichos ángulos diedros opuestos por su arista central, un tubo halógeno con forma de "U" provisto con un filamento de encendido de carbono, dispuesto de manera que sus ramas son paralelas al eje central del soporte y quedan comprendidas por debajo de la capa de espirales que conforman el resistor calefactor devanado alrededor de los bordes acanalados del soporte. El tubo halógeno, se conecta independientemente en el circuito del secador, en tanto que el resistor calefactor definido por una espiral de alambre adecuado, tiene su punto medio conectado a un borne terminal, desde donde se conecta al circuito eléctrico de control, y sus extremos fijados en terminales engrapados en un extremo de dichas placas integrantes del soporte.



ES 2 302 456 A1



OFICINA ESPAÑOLA DE  
PATENTES Y MARCAS

ESPAÑA

⑪ ES 2 302 456

⑫ Nº de solicitud: 200603235

⑬ Fecha de presentación de la solicitud: 20.12.2006

⑭ Fecha de prioridad:

## INFORME SOBRE EL ESTADO DE LA TÉCNICA

⑮ Int. Cl.: A45D 20/12 (2006.01)

### DOCUMENTOS RELEVANTES

| Categoría | Documentos citados                                                                                             | Reivindicaciones afectadas |
|-----------|----------------------------------------------------------------------------------------------------------------|----------------------------|
| Y         | ES 2177285 T3 (PARK CHUL YONG; SHIN HEUNG ENGINEERING CO LTD) 01.12.2002, todo el documento.                   | 1-4                        |
| Y         | US 6285828 B1 (CAFARO et al.) 04.09.2001, todo el documento.                                                   | 1-4                        |
| A         | JP 2005177234 A (MATSUSHITA ELECTRIC WORKS LTD) 07.07.2005, resumen; figuras [en línea]. Recuperado de EPOQUE. | 1                          |
| A         | WO 2004030491 A1 (SLINGO FRED M) 15.04.2004, descripción; figuras.                                             | 1                          |
| A         | EP 1688060 A1 (LIN CHENG-PING) 09.08.2006, descripción; figura 3.                                              | 1                          |
| A         | WO 9614776 A1 (DELL OGLIO ROSARIO) 23.05.1996, resumen; figuras [en línea]. Recuperado de EPOQUE.              | 1                          |

#### Categoría de los documentos citados

X: de particular relevancia

Y: de particular relevancia combinado con otro/s de la misma categoría

A: refiere al estado de la técnica

O: referido a divulgación no escrita

P: publicado entre la fecha de prioridad y la de presentación de la solicitud

E: documento anterior, pero publicado después de la fecha de presentación de la solicitud

#### El presente informe ha sido realizado

☒ para todas las reivindicaciones

☐ para las reivindicaciones nº:

Fecha de realización del informe

30.05.2008

Examinador

E. Martín Malagón

Página

1/1

[54] TANTALUM CARBIDE OR  
TANTALUM-ALLOY CARBIDE FILAMENT  
MOUNTING AND METHOD

[75] Inventor: Richard Corth, East Orange, N.J.

[73] Assignee: Westinghouse Electric Corporation,  
Pittsburgh, Pa.

[22] Filed: Mar. 21, 1966

[21] Appl. No.: 535,835

[52] U.S. Cl. .... 313/344; 313/218;  
313/272; 313/276; 313/311; 313/316;  
313/315; 313/331

[51] Int. Cl.<sup>2</sup> ..... H01J 1/16; H01J 19/06;  
H01K 1/04; H01J 1/88

[58] Field of Search ..... 313/115, 217, 218, 271,  
313/272, 273, 279, 311, 315, 316, 331, 332,  
333, 344, 355

[56] References Cited

UNITED STATES PATENTS

1,637,034 7/1927 Bergmans ..... 313/344 X  
2,434,478 1/1948 Allen ..... 313/333 X

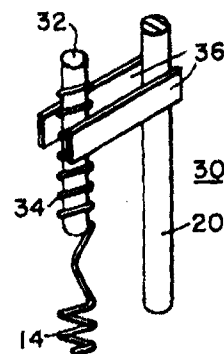
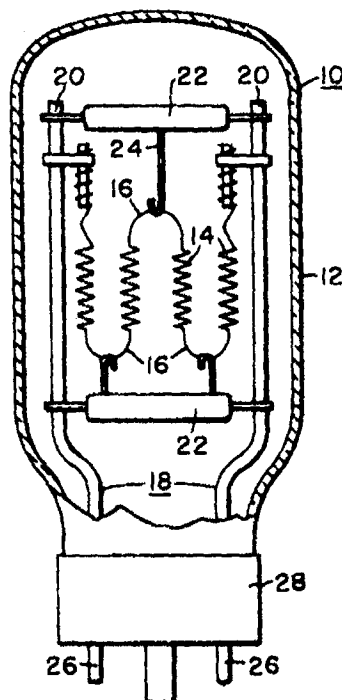
2,987,643 6/1961 Ackerman ..... 313/315  
3,022,437 2/1962 Cooper ..... 313/218  
3,183,395 5/1965 Rively et al. .... 313/272 X  
3,237,284 3/1966 Bird ..... 313/315  
3,287,591 11/1966 Sloan ..... 313/331 X

Primary Examiner—Andrew J. James  
Attorney, Agent, or Firm—W. D. Palmer

[57] ABSTRACT

Coiled incandescible filament which principally comprises tantalum carbide has coiled end portions thereof overfitting relatively thick tantalum carbide members, with the inner surfaces of the overfitting coils welded to the relatively thick members. Electrical connection and support for the filament is made to the relatively thick, overfitted members, rather than the fine, brittle filament. In order to effect the weld between the overfitting coils and the relatively thick members, the coils and relatively thick members are first overfitted as metals and then carbided, with diffusion welds therebetween formed during the carbiding process.

6 Claims, 6 Drawing Figures



**TANTALUM CARBIDE OR TANTALUM-ALLOY CARBIDE FILAMENT MOUNTING AND METHOD**

This invention generally relates to tantalum carbide filaments and, more particularly, to a tantalum carbide or tantalum-alloy carbide filament mount and to a lamp incorporating such mount, as well as a method for making the mount.

Tantalum carbide and tantalum-alloy carbide filaments for incandescent lamps are known in the art. When operated in a suitable gaseous atmosphere comprising hydrogen, halogen and carbon, for example, such filaments can be operated at a very high temperature, such as from 3300° K to 3700° K. This operating temperature range is near and exceeds the melting point of tungsten per se (3643° K.) and is far above the normal operating temperature of tungsten filaments. This makes a tantalum carbide or tantalum-alloy carbide filament particularly useful in applications such as projection lamps where it is desirable to operate the lamp in as bright a manner as possible commensurate with even a relatively short life.

One of the drawbacks which prevents commercial use of tantalum carbide filaments is the difficulty encountered in mounting the fabricated filament. Tantalum carbide and tantalum-alloy carbide filaments are extremely brittle and if the thin filament is clamped by lead-in supports, there is a tendency to break the filament. In addition, a very thin tantalum carbide filament is quite difficult to weld to a supporting member, since a loss of carbon will normally occur at the junction of the weld and the filament tends to shatter during welding. Also, if a thin tantalum carbide filament is intimately connected to a metallic support member, either by clamping or by welding, a loss of carbon will occur during lamp operation at the junction of the filament and the metal lead-in support, due to diffusion of carbon into the metal lead-in support. The resulting change in composition of the filament near the lead-in support is deleterious to the life of the filament. It has been the practice to mount the filament in the completed lamp as a metallic filament, which is thereafter converted to tantalum carbide. From a commercial standpoint, this is impractical.

It is the general object of this invention to provide a combination connection for mechanically supporting and electrically connecting a tantalum carbide filament to a main filament support.

It is another object to provide a lamp which incorporates a tantalum carbide filament which is connected to a main supporting frame by means of an improved filament support and connection.

It is a further object to provide a method for securing a tantalum carbide filament to a relatively heavy member for purposes of support and electrical connection.

It is an additional object to provide a method for forming a tantalum carbide or tantalum-alloy carbide filament and the connecting support therefor prior to incorporation into a lamp.

The foregoing objects of the invention, and other objects which will become apparent as the description proceeds, are achieved by providing a combination connection for mechanically supporting and electrically connecting a coiled, elongated, incandescible filament principally comprising tantalum carbide to a main filament support and electrical connection means. The connection comprises a relatively thick,

elongated member which principally comprises tantalum carbide. A coiled end extension of the elongated filament coil snugly overfits at least a part of the relatively thick, elongated tantalum carbide member, and the inner surface of the overfitted turns of the coiled end extension are welded to the relatively thick, elongated member. This latter member in turn is electrically connected to and mechanically supported by the main filament support and electrical connection means, such as the supporting frame. In forming the filament support, an elongated filamentary coil, which principally comprises tantalum metal, is provided with a coiled end extension and this end extension is fitted over in snug contacting relationship with at least a part of a relatively thick, elongated member principally comprising tantalum metal. The coil and the relatively thick, elongated member are then heated at a predetermined temperature and for a predetermined time in an atmosphere consisting essentially of carbon as the only reactive constituent to convert tantalum metal of both the coil and the thick member to tantalum carbide. During this conversion from metal to carbide, a diffusion weld is effected between the contacting surfaces of the filament coiled end extension and the relatively thick, elongated member. Since this latter member has a substantial mass, electrical connection and support can readily be made thereto.

For a better understanding of the invention, reference should be made to the accompanying drawings, wherein:

FIG. 1 is an elevational view, shown partly in section, of a projection lamp which incorporates the combination connection of the present invention;

FIG. 2 is an enlarged, fragmentary, isometric view showing details of the combination connection of the present invention;

FIG. 3 is a flow diagram showing the basic steps of the present method;

FIG. 4 is an elevational view showing a metallic filament and metallic filament support and connection in position on a carbon supporting member, prior to making the connection of the present invention;

FIG. 5 is an elevational view of FIG. 4; and

FIG. 6 is an isometric view, partly broken away, showing the carbiding step wherein the filament is diffusion welded to the relatively thick member.

With specific reference to the form of the invention as shown in the drawings, the projection lamp 10 of FIG. 1 comprises a sealed envelope 12, at least a portion of which is radiation transmitting. The filament 14 is formed as a multi-barrel filament having four coils, with each barrel of the filament connected by an uncoiled portion 16. Preferably the coiled filament 14 is formed of tantalumtungsten carbide wherein ratio by weight of tantalum to tungsten is 90-10. Other tantalum-containing alloys could be used such as described in U.S. Pat. No. 3,219,493, dated Nov. 23, 1965, wherein the tantalum metal is present in a major percentage. Alternatively, the filament 14 can be formed of stoichiometric tantalum carbide.

The envelope 12 encloses an atmosphere suitable to support operation of a tantalum carbide filament and such atmospheres are well known in the art, an example comprising an atmosphere of halogen, hydrogen and carbon.

A supporting frame structure 18, which constitutes a main filament support and electrical conduction means, is rigidly affixed within the envelope 12. This

[54] ELECTRIC AIR HEATING ELEMENT

[75] Inventors: Dov Z. Glucksman, 43 Norwood Ave., Newton, Mass. 02159; Karl H. Weidemann, Brookline, Mass.

[73] Assignee: Dov Z. Glucksman, Newton, Mass.

[21] Appl. No.: 878,945

[22] Filed: Feb. 17, 1978

[51] Int. Cl.<sup>3</sup> ..... H05B 3/02

[52] U.S. Cl. .... 219/375; 338/218; 338/282; 338/302; 338/321

[58] Field of Search ..... 338/57, 58, 217, 218, 338/252, 267, 270, 278, 282-283, 296, 297, 298, 299, 301-305, 317, 319, 321; 219/368-370, 373-375, 551, 550, 532; 34/96-98, 245 R

[56] References Cited

U.S. PATENT DOCUMENTS

|           |         |               |         |
|-----------|---------|---------------|---------|
| 1,490,089 | 4/1924  | Bridges       | 338/296 |
| 1,733,023 | 10/1929 | Kremenezky    | 338/301 |
| 1,840,168 | 1/1932  | Mucher        | 338/321 |
| 2,298,315 | 10/1942 | Siegel et al. | 338/296 |
| 2,502,044 | 3/1950  | Isaacson      | 338/282 |
| 3,304,625 | 2/1967  | Gesmar et al. | 34/99   |
| 3,391,372 | 7/1968  | McLean        | 338/321 |

FOREIGN PATENT DOCUMENTS

|         |         |                      |         |
|---------|---------|----------------------|---------|
| 2015628 | 10/1971 | Fed. Rep. of Germany | 219/374 |
| 2608510 | 9/1977  | Fed. Rep. of Germany | 219/375 |
| 2618819 | 11/1977 | Fed. Rep. of Germany | 219/375 |
| 2619097 | 11/1977 | Fed. Rep. of Germany | 219/375 |
| 166278  | 5/1926  | France               | 338/218 |

Primary Examiner—Elliot A. Goldberg

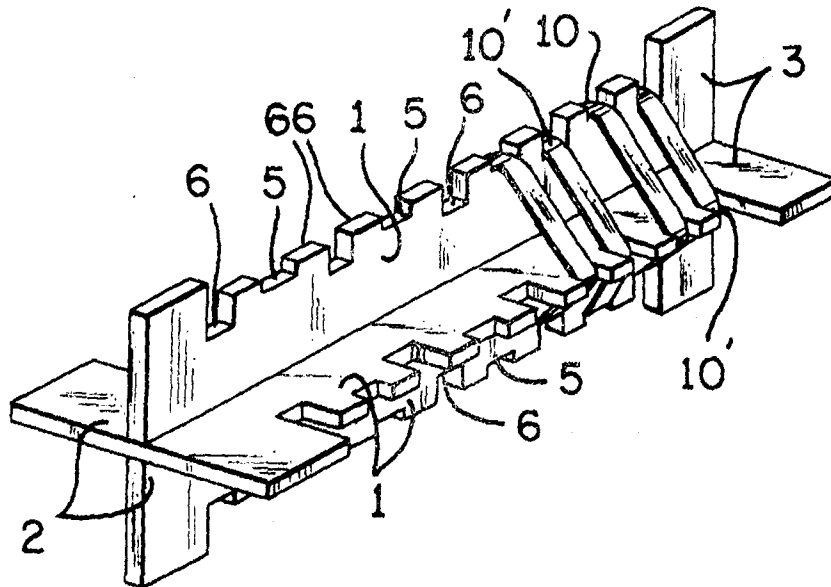
Assistant Examiner—Bernard Roskoski

Attorney, Agent, or Firm—John S. Roberts, Jr.

[57] ABSTRACT

An electric air heating element is designed for positioning in the cylindrical or conical outlet tube of a hair dryer. It consists of a star-shaped coil carrier in the shape of four fins extending radially from a common center line in the axis of the outlet tube towards the tube walls. The fin edges are serrated by adjacent rectangular slots, the slots on each edge penetrating alternately to a shallow and to a greater depth, and a ribbon-shaped resistor laid into these slots is helically wound around the coil carrier. In this way successive windings lie in different planes and air turbulence around the heating coil is thereby increased, improving the heat transfer between the resistor windings and the throughflowing air.

6 Claims, 3 Drawing Figures



## ELECTRIC AIR HEATING ELEMENT

## BACKGROUND OF THE INVENTION

The invention relates to an electric heating element, particularly to an element suitable for hair dryers.

Heating elements for hair dryers should be as short as possible in order to reduce the weight of the appliance and to make it easy to handle; on the other hand it should present an adequate heat transfer surface while offering a minimum of flow resistance, with a view to permit the provision of a small fan and fan motor in the dryer. In the past I have found that the most suitable heating element answering the above requirements is in the shape of a ribbon-shaped resistor helically wound on a spider-shaped core, in such a manner that the ribbon surfaces of all windings are parallel to the air flow. This design ensures a minimum of flow resistance, since the front surface offered to the air flow by the thin resistor is very small compared with the total heat exchange area. A high heat exchange coefficient is attained by the air spaces between adjoining coil windings, because they interrupt the boundary layer apt to form along a plain continuous surface, and thus create air turbulence.

Although this type of heater coil gives very good results, I have now discovered that I can still improve the heat transfer by staggering successive windings and thus obtain a shorter total length of the element by providing less windings which, however, dissipate the same heat energy through a smaller exchange surface by virtue of increased turbulence.

## SUMMARY OF THE INVENTION

The heating element which adapted to be positioned in a cylindrical or conical duct of a hair dryer or other apparatus delivering hot air, comprises a solid star-shaped coil-carrier of a non-conductive and heat-resistant material, in the shape of at least four longitudinal fins extending in radial direction from a common jointing line. The outer edges of all fins are serrated by substantially equidistant rectangular slots of different depth as measured from said outer edge of each fin, and a ribbon-shaped resistor is wound helically around said coil carrier to form a coil. The windings are laid in successive rectangular slots with the ribbon surface substantially parallel to the outer fin edge and to the air flow. The resulting coil thus comprises at least two parallel surfaces of resistor windings which, in the case of four fins, form at least two coaxial square cylinders or cylinder frustums. In a preferred embodiment of the heating element each fin edge is serrated by alternate slots of shallow depth and of greater depth respectively, thus forming two parallel layers of resistor windings.

In order to provide a larger distance between the coil and the duct walls both end portions of each fin are radially extended to a greater length than its serrated edge, which end portions serve to firmly secure the heating element in the duct or outlet of the air heating apparatus.

With a view to shorten the apparatus the center portion at one end of the coil carrier may be recessed to permit placing therein an electric fan motor, the resistor coil surrounding the motor at this end.

The ribs may be perforated in order to reduce the weight of the element and to increase the air turbulence.

## SHORT DESCRIPTION OF THE DRAWINGS

FIG. 1 is an isometric view of a coil carrier, partly wound, suitable for a cylindrical duct,

FIG. 2 is an isometric view of a coil carrier provided with slots of three different depth dimensions, partly wound and suitable for a conical duct, and

FIG. 3 is a side view of a heating element assembly, incorporating the coil carrier illustrated in FIG. 1.

## DESCRIPTION OF THE PREFERRED EMBODIMENT

The coil carrier illustrated in FIG. 1 comprises four rectangular fins 1 of similar width and length joined at right angles along their inner edges on a common center line. The respective end portions, 2 and 3, of the fins extend to the largest distance from the common center and serve to locate the element in a cylindrical air discharge duct D, FIG. 3, while the central edge portion between these ends, is slightly recessed. This portion of each fin is provided with a plurality of inwardly extending rectangular slots or notches 5 and 6, slots 5 being a shallow depth, while the slots 6 are deeper, as measured from the edge, i.e. the bottom of the slots 6 is nearer the carrier center than that of the slots 5. The slots are of equal width and equidistantly spaced by a common module denoted at 66, FIGS. 1 and 2, however staggered by one quarter module in respect of every two fins positioned at a right angle, in one sense of angular progress, for the purpose of providing a helical path for the resistor ribbon. Four windings, 10 and 10', of a ribbon-shaped resistor are shown to be wound around the coil carrier, alternately laid in shallow and deep slots. The resistor is slightly narrower than the slots 5 and 6, and it can be readily discerned that the windings 10 laid in the shallow slots are of greater length than those (10') in the deeper slots, thus alternate windings in the shape of larger and smaller squares are being formed, corresponding sides of all larger squares lying in common planes, and similarly the sides of all smaller squares. It is understood that only a few windings have been such shown in order to present a clear picture of the slots. It is further understood that for clearness sake the size of the slots and the module are shown larger in proportion to the total dimensions of the coil carrier than in an actual embodiment, which would have a much larger number of windings.

A complete heating element is shown in FIG. 3. Herein a coil carrier comprises four fins 1 which are jointed at common center, all fins being of equal length and width, their end portions 2 and 3 being higher than the slotted center portion. The fins are perforated by a number of round holes 8 which serve to create greater flow turbulence, besides somewhat reducing the weight of the unit. Each fin edge is serrated along its recessed center portion by alternating shallower and deeper, rectangular slots 5 and 6 respectively. A heating coil is formed from a ribbon-shaped resistor laid successively into the slots 5 and 6 and wound around the coil carrier beginning from a L.H. terminal 20 to a R.H. terminal 21. The right hand end of the coil carrier is recessed (12) in its center corresponding to the shape of a fan motor to be positioned in this recess when assembling a hair dryer or another air heating apparatus.

The coil terminal 20 is connected to a switch (not shown) by a cord 27 via a terminal 22 and through a fuse 23 and a thermostatic switch 24, while a second cord wire 28 is attached to the second coil terminal 21.



US006285828B1

(12) **United States Patent**  
**Cafaro**

(10) **Patent No.:** **US 6,285,828 B1**  
(45) **Date of Patent:** **Sep. 4, 2001**

D3

(54) **INFRARED HAIR DRYER HEATER**

(75) **Inventor:** **Michael Cafaro, El Paso, TX (US)**

(73) **Assignee:** **Helen of Troy, El Paso, TX (US)**

(\*) **Notice:** Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

|             |        |                 |         |
|-------------|--------|-----------------|---------|
| 4,323,761   | 4/1982 | Hubner .        |         |
| 4,382,174   | 5/1983 | Barns .         |         |
| 4,395,619   | 7/1983 | Harigai .       |         |
| 4,595,838   | 6/1986 | Kerschgens .    |         |
| 4,602,143   | 7/1986 | Mack et al. .   |         |
| 4,910,382   | 3/1990 | Kakuya et al. . |         |
| 6,053,180 * | 4/2000 | Kwan            | 132,232 |
| 6,205,677 * | 3/2001 | Yune            | 34,266  |

**FOREIGN PATENT DOCUMENTS**

|            |         |        |
|------------|---------|--------|
| 2950001 *  | 6/1981  | (DE) . |
| 1522777 *  | 8/1978  | (GB) . |
| 3-224504 * | 10/1991 | (JP) . |
| 6-125810 * | 5/1994  | (JP) . |

\* cited by examiner

*Primary Examiner*—John A. Jeffery

(74) *Attorney, Agent, or Firm*—John E. Toupak; Harold G. Jarcho

(21) **Appl. No.:** **09/575,992**

(22) **Filed:** **May 23, 2000**

(51) **Int. Cl.:** **A45D 20/00**

(52) **U.S. Cl.:** **392/385; 392/410; 34/97; 34/266**

(58) **Field of Search** **392/384, 385, 392/409, 410; 37/96, 97, 266, 267; 607/100, 104, 107, 96**

(56) **References Cited**

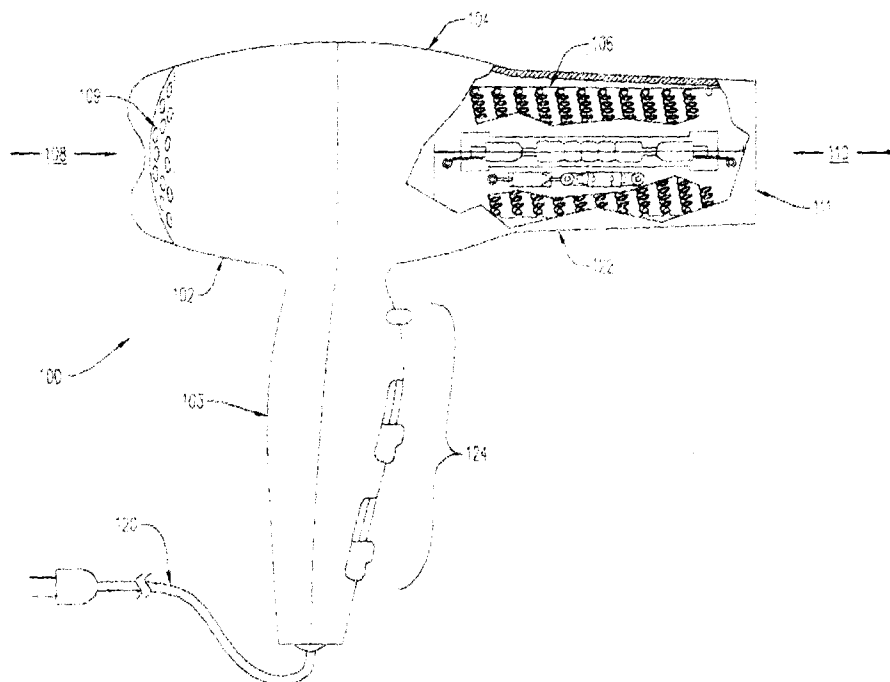
**U.S. PATENT DOCUMENTS**

|             |         |                 |         |
|-------------|---------|-----------------|---------|
| 1,579,513 * | 4/1926  | Cameron         | 34/97   |
| 1,609,412 * | 12/1926 | Kolisch         | 34/96   |
| 1,639,753 * | 8/1927  | Shelton         | 392/383 |
| 1,659,780 * | 2/1928  | Meyer           | 34/96   |
| 1,660,802 * | 2/1928  | Martin          | 34/97   |
| 1,669,569 * | 5/1928  | Meyer           | 34/96   |
| 1,686,024 * | 10/1928 | Meyer           | 34/97   |
| 1,781,879 * | 11/1930 | Norden          | 392/383 |
| 1,785,418 * | 12/1930 | Meyer           | 34/96   |
| 3,289,679 * | 12/1966 | Zellerman       | 34/97   |
| 4,263,500   | 4/1981  | Springer et al. |         |

(57) **ABSTRACT**

A hair dryer having both a fan-forced convection heater and radiant heater which emits energy having wavelengths in both the infrared and visible spectrum. The housing of the dryer is translucent to visible light but absorbent of infrared radiation and arranged to facilitate the transfer of heat generated by the absorption of the infrared radiation into the fan-forced airflow. The visible light emanating from the dryer provides an indicator of the dryer's operation and a warning of the presence of the otherwise invisible and otherwise dangerous infrared radiation.

**8 Claims, 5 Drawing Sheets**





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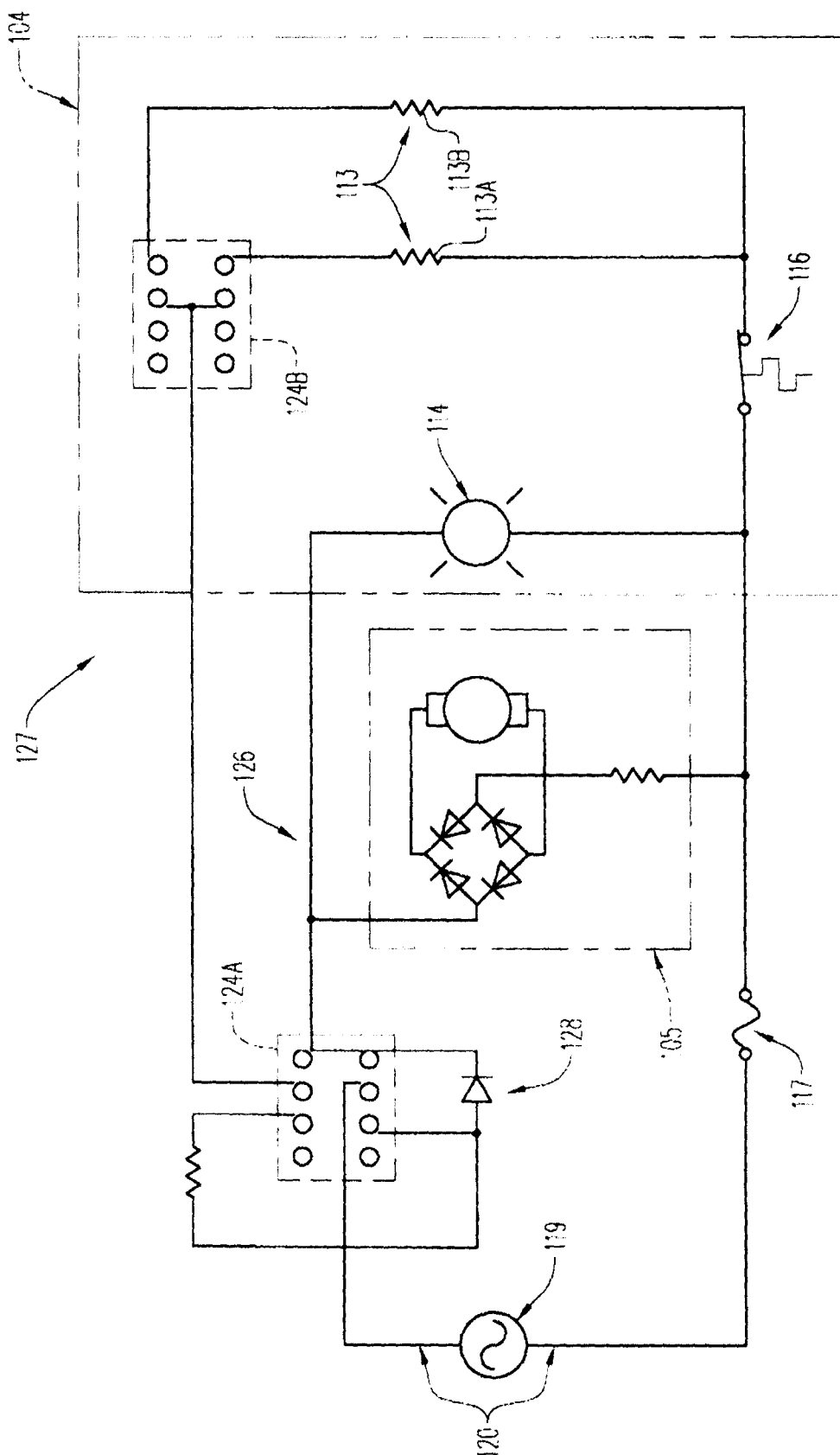


FIG. 4

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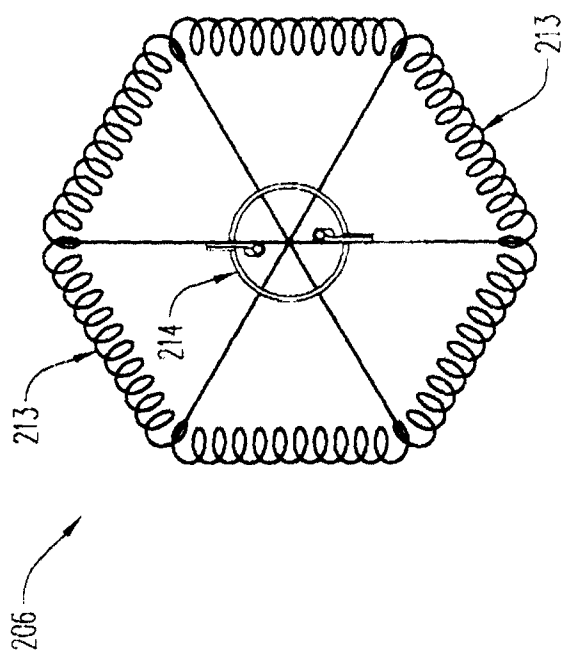


FIG. 7

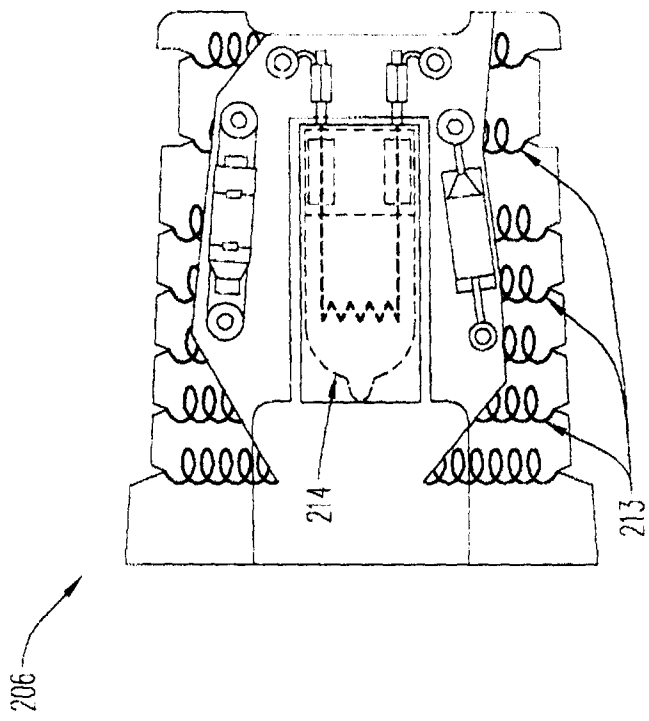


FIG. 6

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VAC source 119, supplied through a power cord 120. The blower, electrical connections of the various components, associated wires and certain electronic circuit components may be similar to the existing art and are therefore not shown for clarity, except schematically in FIG. 4.

The housing's head portion includes a tubular duct 122, which surrounds the heater to force the flowing air there-through and which directs the heated airflow 110 out through the exhaust opening 111. The duct is comprised of a translucent material that allows only the visible light emanating from the halogen lamp to glow through. This provides the benefits that a user can instantly recognize when the heater is energized without the loss of valuable infrared light, and that this visible glowing of the head, which comprises the dryer's hot components, serves as an indicator to warn the user where not to grasp the dryer.

The housing's handle is equipped with a switch arrangement 124 which allows the user to select a variety of air flow and temperature settings as later described.

In operation, the dryer's exhaust opening 111 is aimed towards wet hair such as around a curling roller. With the heater energized, hot air 110 is directed toward the wet hair and both light and infrared radiation are emitted longitudinally from the halogen lamp towards the hair. That light and radiation exiting the lamp radially impinges the tubular duct, where the longer wavelength infrared radiation is absorbed while the shorter wavelength visible light is passed. In this unique arrangement, the heat created by the absorption of the radially emitted infrared radiation is efficiently captured at the wall of the tubular duct and transferred into the passing air flow so that it is directed toward the hair, while only the visible light is emitted radially from the dryer to serve the indicating and warning functions previously described.

FIG. 4 depicts the electrical circuitry of the first embodiment. It will be noted that certain components shown, such as the blower 105, switch arrangement 124 comprising mode switch 124A and temperature switch 124B, thermostat 116, convection heater 113, halogen lamp 114, and thermal fuse 117, are those already described and physically mounted according to the prior description, being shown only schematically in this diagram.

The circuit is provided with power from a standard 120 VAC supply 119. Mode switch 124A is adapted in the "high" position for providing that 120 VAC directly to the blower/lamp subcircuit 126 and to the heating subcircuit 127. In the "low" position, power is routed through a diode 128, which reduces the blower speed. Temperature switch 124B allows the selection of either full power from the convection heater 113, by connecting either both heating coils 113A and 113B when in the "high" position, or only the low-power coil 113B when in the "low" position.

In operation, the blower 105 is energized to force air through tubular duct, past the energized convection heater and halogen lamp, where it is heated. The blower also serves to circulate the heated air over the thermostat 116 and thermal fuse 117.

A second embodiment 200 of the invention is depicted in FIGS. 5 through 7. In this embodiment, housing 202 is formed by the hinged connection of handle portion 203 and head portion 204 to provide for the folding and more compact packaging and storing of the dryer. Similar to the first embodiment, heater 206 is comprised of both a convection heating element comprising a number of electric

heating coils 213 and a radiant heating element comprising halogen lamp 214. Other aspects of this embodiment are identical to those already described.

It should be understood that the above are descriptions of the preferred embodiments of the invention and, as such, are merely representative of the invention but not exclusive of other embodiments which may fall within the spirit of the invention. Therefore, the scope of the invention should only be limited by the following claims.

What is claimed is:

1. A hair dryer comprising:
  - a convection heater for providing a current of air;
  - a radiant heater for emitting energy having wavelengths in both the infrared and visible spectrum;
  - a tubular duct surrounding said radiant heater, said duct being substantially translucent to energy having wavelengths in the visible spectrum and substantially opaque to energy having wavelengths substantially in the infrared spectrum; and
  - a blower for forcing said current of air past said convection and radiant heaters, whereby said current of air is heated and exhausted from said hair dryer.
2. A hair dryer as in claim 1 wherein said hair dryer is a portable hand-held hair dryer and said radiant heater is a halogen lamp.
3. A hair dryer as in claim 1 wherein said convection heater comprises a plurality of heating coils.
4. A hair dryer as in claim 3 further comprising thermostatic control means for sensing the temperature within said hair dryer and for enabling one of said heaters when said temperature is below a given level and for disabling said one of said heaters when said temperature is above said given level.
5. A hair dryer as in claim 1 further comprising thermostatic control means for sensing the temperature within said hair dryer and for enabling both of said heaters when said temperature is below a given level and for disabling both of said heaters when said temperature is above said given level.
6. A hair dryer as in claim 1 further comprising a housing having a tubular duct surrounding said convection heater and adapted to direct said current of air substantially through said convection heater whereby said current of air is heated.
7. A hair dryer comprising:
  - a blower for generating a current of air;
  - a convection heater having a plurality of heating coils;
  - a halogen lamp adapted for emitting visible light and infrared energy; and
  - a housing having an exhaust opening and a tubular duct surrounding both said convection heater and said lamp, said duct being adapted to direct said current of air substantially through said convection heater wherein said current of air is heated, said duct being substantially opaque to said infrared energy such that said radiant energy is retained within said duct, and said duct being substantially translucent to said visible light, and whereby said visible light is emitted through said duct and said exhaust opening, and substantially all of said heated air and said retained infrared energy are exhausted through said exhaust opening.
8. A hair dryer as in claim 3 wherein said plurality of heating coils is adapted for selective energization to provide heat to said current of air at low or high levels.

\* \* \* \* \*



US006378225B1

(12) **United States Patent**  
**Slingo**

(10) **Patent No.:** **US 6,378,225 B1**  
(45) **Date of Patent:** **Apr. 30, 2002**

D4

(54) **HAIR DRYER EMPLOYING FAR-INFRARED RADIATION**

5,077,461 A \* 12/1991 Hasegawa ..... 219/553  
5,996,243 A \* 12/1999 Chang et al. .... 34/97  
6,205,677 B1 3/2001 Yune

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\* cited by examiner

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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.

(57) **ABSTRACT**

Employing a radiator made of a ceramic adapted when  
heated to radiate far-infrared radiation, a hair dryer com-  
prises an elongate body, which has an inlet end defining an  
inlet and an outlet end defining an outlet, a fan, which is  
adapted when driven to draw air into the inlet, to move air  
through the elongate body, and to blow air from the outlet,  
an electrical motor, which is adapted when energized to  
drive the fan, and an electrical heater, which is mounted  
within the elongate body, between the fan and the outlet. The  
ceramic radiator, which is tubular, is mounted within the  
elongate body, between the fan and the outlet and near the  
electrical heater, which is configured as an elongate coil  
deployed around the ceramic radiator and which is adapted  
when energized to heat air pulled through the elongate body  
by the fan and to heat the ceramic radiator.

(21) **Appl. No.:** **09/824,066**

(22) **Filed:** **Apr. 2, 2001**

(51) **Int. Cl.**<sup>7</sup> ..... **A45D 20/00**

(52) **U.S. Cl.** ..... **34/97; 34/269; 34/90;**  
**392/375; 392/385**

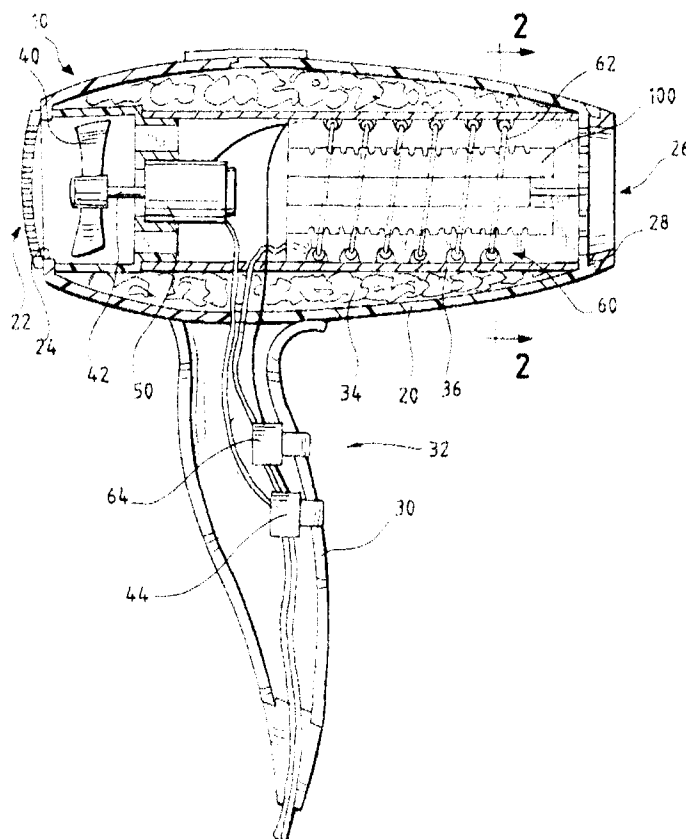
(58) **Field of Search** ..... **34/90, 96, 97,**  
**34/98, 99, 266, 267, 269; 392/375, 379,**  
**380, 381, 382, 383, 384, 385**

(56) **References Cited**

**U.S. PATENT DOCUMENTS**

4,316,077 A \* 2/1982 Carlson ..... 219/370  
4,636,617 A \* 1/1987 Petersen et al. .... 219/375  
4,757,183 A \* 7/1988 Karey et al. .... 219/365

**6 Claims, 1 Drawing Sheet**



# HAIR DRYER EMPLOYING FAR-INFRARED RADIATION

## FIELD OF THE INVENTION

This invention pertains to a hair dryer employing a radiator made of a ceramic adapted when heated to radiate far-infrared radiation.

## BACKGROUND OF THE INVENTION

Conventionally, a hair dryer employs a heating wire, such as a nickel-chromium (Ni—Cr) wire, and relies upon heat convection only to dry a user's hair.

As exemplified in U.S. Pat. No. 6,205,677 (from International Application No. PCT/KR99/00336) it has been known for a hair dryer to employ a heater radiating far-infrared radiation. As exemplified therein, the heater radiating far-infrared radiation is a halogen heater, which comprises a heating wire within a gas-filled, quartz tube. Such a hair dryer employs far-infrared radiation as well as heat convection to dry a user's hair.

Certain ceramics containing silica oxide (SiO<sub>2</sub>) and aluminum oxide (Al<sub>2</sub>O<sub>3</sub>) are known to radiate far-infrared radiation when heated. In some publications, because of biological and physiological effects attributed to far-infrared radiation by researchers in Japan, Korea, and elsewhere, such ceramics that radiate far-infrared radiation are called bio-ceramics. Also, in some publications, far-infrared radiation is called by a "FIR" acronym.

Hereinbefore and hereinafter, although far-infrared radiation refers to a much wider range in astronomy and astrophysics, far infrared radiation refers to electromagnetic radiation having a wave length in a range from approximately six microns to approximately fourteen microns.

## SUMMARY OF THE INVENTION

This invention provides a hair dryer employing a radiator made of a ceramic, such as a bio-ceramic, which is adapted when heated to radiate far-infrared radiation. A ceramic suitable for the radiator is available commercially from Tae Yang Ind. Co. of Majungong 87-1, Sugu, Inchon, Korea, under its CELAMIN trademark.

The hair dryer comprises an elongate body, which has an inlet end defining an inlet and an outlet end defining an outlet. The hair dryer further comprises a fan, which is adapted when driven to draw air into the inlet, to move air through the elongate body, and to blow air from the outlet, and an electrical motor, which is adapted when energized to drive the fan. The hair dryer further comprises an electrical heater, which is mounted within the elongate body, between the fan and the outlet.

This invention contemplates that the ceramic radiator is mounted to the elongate body, near the electrical heater, and that the electrical heater is adapted when energized to heat air pulled through the elongate body by the fan and to heat the ceramic radiator. Preferably, the ceramic radiator is tubular and is mounted within the elongate body and the electrical heater is configured as an elongate coil, which is deployed around the ceramic radiator.

For a discussion of certain effects attributed to far-infrared radiation, particularly in a context of a hair dryer, the disclosure of U.S. Pat. No. 6,205,677, supra, is incorporated herein by reference.

## BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a longitudinal, cross-sectional view of a hair dryer employing a ceramic radiator, as discussed above, and constituting a preferred embodiment of this invention.

FIG. 2 is a transverse, cross-sectional view taken along line 2-2 of FIG. 1, in a direction indicated by arrows.

## DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

As shown, a hair dryer 10 employing a ceramic radiator 100, as discussed above, constitutes a preferred embodiment of this invention. When heated in a manner to be later described, the ceramic radiator 100 radiates far-infrared radiation, i.e., electromagnetic radiation having a wave length in a range from approximately six microns to approximately fourteen microns.

The hair dryer 10 comprises an elongate body 20, which has an inlet end 22 defining an inlet 24 and an outlet end 26 defining an outlet 28 and which has an attached handle 30 mounting an electrical switching means 32. The elongate body 20 is lined with thermally insulative materials 34, 36, of types used conventionally in hair dryers.

The hair dryer 10 further comprises a fan 40, which is adapted when driven to draw air into the inlet 24, to move air through the elongate body 20, and to blow air from the outlet 28, and an electrical motor 50, which is adapted when energized to drive the fan 40 via a rotary shaft 42. The hair dryer 10 further comprises an electrical heater 60, which is mounted within the elongate body 20, between the fan 40 and the outlet 28 and which comprises an elongate coil 62 of a heating wire, such as a nickel-chromium (Ni—Cr) wire. The elongate coil 62 is mounted within the elongate body 20 via two crossed mounting brackets 66.

The fan 40 and the electrical heater 60 are controlled by the electrical switching means 32, through which the fan 40 and the electrical heater 60 are connectable to a source (not shown) of electrical power. The electrical switching means 32 may comprise a single switch (not shown) to control the fan and to control the electrical heater 60 or, if desired, a separate switch 44 to control the fan 40 and a separate switch 64 to control the electrical heater 60. The fan 40 and the electrical heater 60 may be thus controlled at a single setting for each or at plural, selectable settings for one or for both.

The ceramic radiator 100, which is tubular, is mounted within the elongate body 20, between the fan 40 and the outlet 28. The ceramic radiator 100 is suspended within the elongate coil 62, which is deployed around the ceramic radiator 100, via the previously mentioned brackets 66. When the fan 40 and the electrical heater 60 are energized, the electrical heater 60 is adapted to heat air moved through the elongate body 20 by the fan 40 and to heat the ceramic radiator 100, which radiates far-infrared radiation.

As compared to known hair dryers relying upon heat convection only, the hair dryer 10 can be effectively operated at lower temperatures and with higher efficiencies.

What is claimed is:

1. A hair dryer employing a radiator made of a ceramic adapted when heated to radiate far-infrared radiation, the hair dryer comprising an elongate body, which has an inlet end defining an inlet and an outlet end defining an outlet, a fan, which is adapted when driven to draw air into the inlet, to move air through the elongate body, and to blow air from the outlet, an electrical motor, which is adapted when energized to drive the fan, and an electrical heater, which is mounted within the elongate body, between the fan and the outlet, the ceramic radiator being mounted to the elongate body, near the electrical heater, which is adapted when energized to heat air moved through the elongate body by the fan and to heat the ceramic radiator.
2. The hair dryer of claim 1 wherein the ceramic radiator is mounted within the elongate body, between the fan and the outlet.



US 20020173780A1

69

(19) **United States**

(12) **Patent Application Publication**  
Altshuler et al.

(10) Pub. No.: **US 2002/0173780 A1**

(43) Pub. Date: **Nov. 21, 2002**

DS

(54) **APPARATUS AND METHOD FOR  
PHOTOCOSMETIC AND  
PHOTODERMATOLOGICAL TREATMENT**

(22) Filed: **Feb. 22, 2002**

**Related U.S. Application Data**

(76) Inventors: **Gregory B. Altshuler**, Wilmington, MA  
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(RU)

(60) Provisional application No. 60/272,745, filed on Mar.  
2, 2001.

**Publication Classification**

(51) Int. Cl.<sup>7</sup> ..... **A61B 18/18; A61N 1/00**

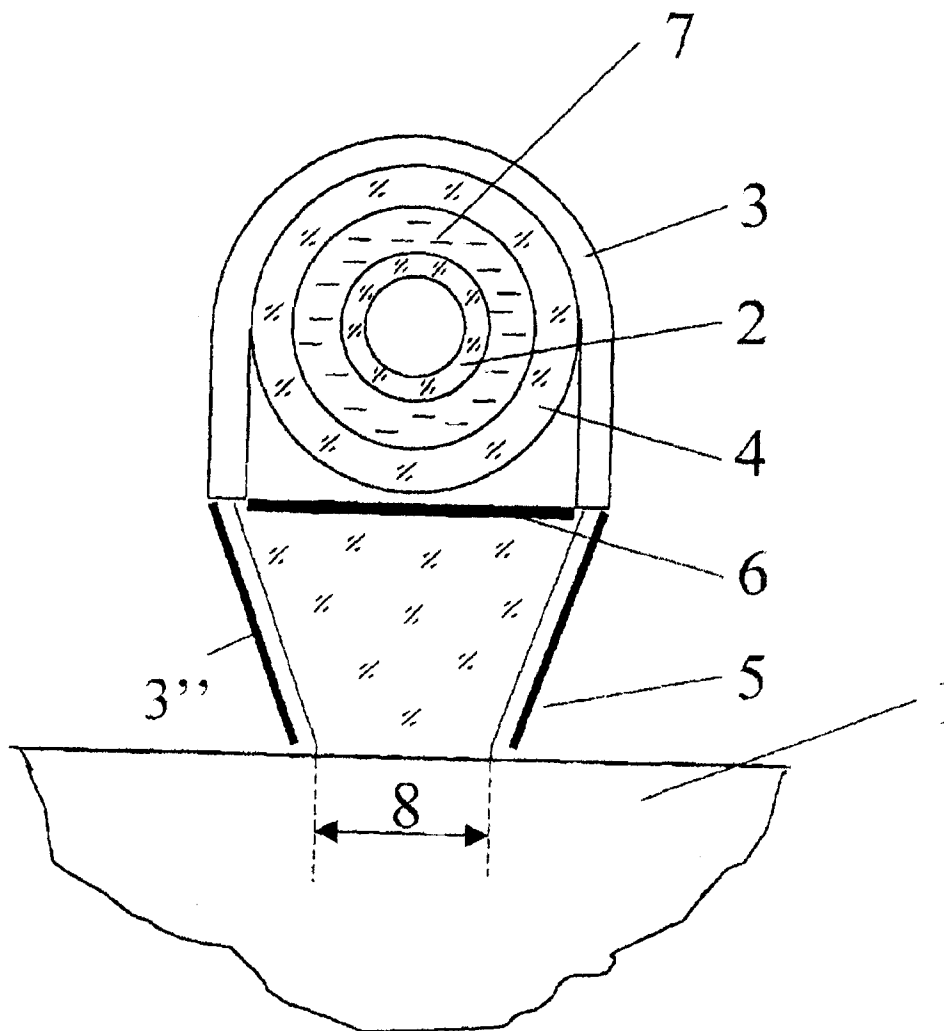
(52) U.S. Cl. .... **606/9; 606/13; 607/88; 606/90**

(57) **ABSTRACT**

This invention relates to apparatus for using a lamp for  
treatment of a patient's skin, which lamp is more efficient  
than prior such devices and to methods of using lamps for  
various skin treatments. The apparatus improves efficiency  
by minimizing photon leakage and by other enhancements.  
The invention also includes various enhancements to  
waveguides used for optical treatment on a patient's skin.

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(21) Appl. No.: **10/080,652**



$\text{W/cm}^2$  within the range 340-900 nm. Thus the short-wave-length part of the spectrum, for example 410 nm, is absorbed more intensively by propherin, but this absorption is reduced considerably at a depth  $\sim 0.5$  mm. At the same time, the red radiation is weakly absorbed by propherin, but is barely reduced at a depth 1 mm. Therefore, a wide spectrum is most effective to injure the bacteria via the photo dynamic effect.

[0094] The second and more effective mechanism of the treatment of acne vulgaris is reducing the sebum production function of the sebaceous gland. This may be achieved by the destruction of sebocytes or the coagulation of blood vessels supplying the sebocytes with nutrient substances. During periods of hyperactivity of sebocytes, the blood vessel net is filled by blood. The combination of a wide-band (340-2400 nm) light source with water filtering which attenuates radiation in the range of water absorption bands (1400-1900 nm) and with intensive cooling ( $-5$  to  $+5^\circ\text{C}$ ) of the epidermis and pressing of the skin, allows selective damage of spider veins supplying the sebaceous gland. Thus, the duration of the pulse should correlate with TDT of these vessels and may be about 1-100 ms for an energy density 5-50  $\text{J/cm}^2$ , the energy density increasing with increasing pulse length. In order to totally or partially damage the sebaceous gland, it is possible to use a direct diffusion channel between the skin surface and the sebaceous gland. This channel is represented by the gap between the hair shaft and outer root sheath and usually is filled by sebum. Molecules and particles with dimensions less than 3  $\mu\text{m}$  with lypophil properties may diffuse through this gap and accumulate in the sebaceous gland. Further, these molecules and particles may be used for the selective photothermolysis of the sebaceous gland by lamp radiation. For this purpose, the lamp radiation spectrum has to be filtered so that its filtered part becomes the same as the absorption spectrum of the molecules and particles. For example: organic dye molecules, melanin, carbon, fluoren with PDT effect, Au, Cu, Ag particle with plasma resonance can increase irradiance around particles. The duration of the pulse should be shorter than the time of thermal relaxation of the sebaceous gland which is 50-1000 ms.

[0095] The intensity and fluence depend on the concentration and extinction of the molecules or particles but they should not exceed the threshold of epidermis damage or destruction. Therefore, cooling of the epidermis may be used to increase the efficiency of the destruction. For more effective delivery of the absorbing molecules and particles to the sebaceous gland, they may be combined with the lypophil particles. Dye molecules may be represented by the molecules of food dye, dye used for hair coloring and others. The particles may be represented by particles of melanin, carbon (for example, Indian ink), etc. Molecules of fullerene (for example,  $\text{C}_{60}$ ) are among the most effective. These molecules have broad band absorption spectrum in the visible range. The important property of these molecules is the generation of singlet oxygen under photoexcitation. Singlet oxygen may additionally damage the sebocytes and bacteria. The insertion of the absorbing molecules and particles into the sebaceous gland may be done by heating of the skin, phonophoresis, electrophoresis magnetophoresis (if the particles have electric or magnet moment).

[0096] Particles inserted into a hair follicle and sebocytes may be used for hair management. In this case the contrast in absorption of the hair follicle with respect to the epidermis

may be increased. This makes the treatment of light/gray hair and highly pigmented skin easier and provides more permanent hair loss (i.e. the absorbing particles or the molecules can be easily delivered into the region close to the bulge). The sebaceous gland may also be destroyed by utilizing the selectivity of specific heat of the gland vs. surrounding dermis, this selectivity being due to the high concentration of lipids in the gland. Thus, the gland may be heated by using band(s) of the spectrum with high water lipid absorption and deep penetration, for example 0.85-1.85  $\mu\text{m}$  with cutting/filtering of the strong peak of absorption of water surround 1.4  $\mu\text{m}$  by a 1-3 mm water filter and selective cooling of the dermis up to the depth of the sebaceous glands (0.5-1 mm).

[0097] Based on the above, preferable components for the device D shown in FIGS. 1, 2 are now considered.

#### [0098] Lamp

[0099] The lamp 2 in the device shown in FIG. 1 may be a gas discharge lamp based on the inertial gases Xe, Kr, Ne and others, a metal halide lamp, mercury vapor lamp, high pressure sodium lamp, fluorescent lamp, halogen lamp, incandescent lamp etc. The lamp has a linear tube shape. Other variations include U shape or ring shape. The dimensions of the lamp are chosen on the basis of the device output parameters. For linear tubular lamps, the optimum shape of the output beam is rectangular  $a \times b$ . The length of the discharge gap, that is distance 1 between electrodes, is chosen to be equal or bigger than one of the rectangular dimensions  $b$ . The inner diameter of the lamp should be minimized, but be sufficient to provide a given life-time  $N$  of the lamp (where  $N$ =number of lamp working cycles). Minimum lamp diameter provides the highest efficiency for transport of radiation energy to the skin and minimum losses of light due to absorption in the lamp. Minimum absorption of light inside the lamp increases the efficiency of back-reflected light from the skin. For low pulse repetition rate, the lamp may be cooled by the gas in gap 7, and for high repetition rate and high mean power, by a liquid in gap 7. The lamp tube may contain ions absorbing unwanted spectral components and converting these components into the desired spectral range. The optimum way to accomplish this is for the coating to reflect the unwanted radiation back into the lamp. This increases the efficiency of the lamp in the desired spectral range due to additional absorption of the reflected components in plasma.

#### [0100] Reflector

[0101] The reflector 3 may have various shapes (FIG. 13). The main conditions providing maximum reflector efficiency are the following:

- [0102] 1. The ratio of the sum of the areas of the reflector's components providing significant reflection to the sum of the areas of the reflector's components which provide little or no reflection must be maximized. To provide this condition, the reflection index for working parts of the reflection must be close to one within the working range of spectrum. The best material for the specular reflector is Ag (visible or IR range) or Al (UV range). The reflector may be coated by a polymer or inorganic coating or the coating may be coated on the inside or outside of tube 4 or on lamp 2. In the later case, foil extending from the tube or other

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DESCRIPCION

Secador de cabello halógeno.

Campo de la invención

La presente invención trata de un secador de pelo halógeno y, más concretamente, de un nuevo secador de pelo halógeno que trata el cabello mediante la acción combinada del calentamiento por convección y el calentamiento por radiación infrarroja.

Antecedentes de la invención

Generalmente, se usa el secador de pelo para secar el cabello mediante una corriente de aire calentado por una resistencia de una aleación de Ni-Cr, por ejemplo. La figura 1 muestra un secador de pelo convencional, que se compone de un cuerpo principal (8) con un mango (2) que se extiende hacia abajo, una abertura de entrada (4) y una abertura de salida (6) en el extremo opuesto, un ventilador (11) accionado por un motor (10), una resistencia (9) colocada delante del ventilador (11) y un interruptor (12) en el mango (2).

El usuario pulsa el interruptor (12) que hace funcionar el motor (10) y la resistencia (9) para extraer el aire caliente por la abertura de salida (6).

Debido a que este tipo de secador de pelo sólo puede secar el cabello por convección de calor, la superficie del cabello se puede calentar fácilmente, mientras que la capa interna del cabello no podrá calentarse lo suficiente en un corto período de tiempo. Por otra parte, si calentamos el cabello durante el tiempo suficiente para secar la capa interna del cabello, el nacimiento del pelo puede quedar dañado por estar expuesto durante mucho tiempo al aire caliente. Además, como la resistencia tiene un rendimiento energético relativamente bajo, el consumo energético es considerablemente alto.

Se conoce un secador de pelo por radiación de calor a partir del documento US4382174A.

Resumen de la invención

Se propone la invención para resolver los problemas mencionados arriba. El objeto de la invención es proporcionar un nuevo tipo de secador de pelo con una resistencia halógena que emite radiaciones infrarrojas e infrarrojas lejanas, en lugar de la resistencia convencional y que evita deterioros y enfermedades del cabello y del cuero cabelludo, y que puede significar un ahorro de energía.

De acuerdo con la invención, se proporciona un secador de pelo halógeno que se compone de un cuerpo principal (8) con un mango (2) que se extiende hacia abajo, una abertura de entrada (4) y una abertura de salida (6) en el extremo opuesto, un interruptor (12) en el mango (2), un ventilador (11) accionado por un motor (10) conectado al interruptor (12) que introduce aire frío por la abertura de entrada (4) y extrae el aire caliente por la abertura de salida (6), una resistencia halógena (14) colocada delante del ventilador (11) y conectada al interruptor (12), que es capaz de emitir una corriente de aire caliente y de radiar rayos infrarrojos e infrarrojos lejanos, y un material aislante (20) alrededor de la resistencia halógena (14).

Descripción breve de los dibujos

La figura 1 muestra el secador de pelo convencional.

La figura 2 muestra la realización de acuerdo con la invención.

Descripción detallada de la invención

Ahora, se describirá en detalle a continuación la presente invención basada en el dibujo. La figura 1 muestra una realización de la invención, en la que el cuerpo principal (8) dispone de un mango (2) que se extiende hacia abajo desde el cuerpo principal (8), una abertura de entrada (4) en la parte trasera del cuerpo principal (8) y una abertura de salida (6) en la parte delantera del cuerpo principal (8). Se coloca un interruptor (12) en el mango (2). Dentro del cuerpo principal (8) se dispone de un ventilador (11) que gira accionado por un motor (10) conectado al interruptor (12). El ventilador (11) introduce aire frío por la abertura de entrada (4) y extrae el aire caliente por la abertura de salida (6). Se coloca la resistencia halógena (14) delante del ventilador (11).

La resistencia halógena (14) está eléctricamente conectada al interruptor (12) y, en funcionamiento, emite una gran cantidad de calor y de radiación infrarroja. La resistencia halógena (14) se construye curvando en forma de U un tubo de cristal de cuarzo (16). Antes de sellarlo, se introducen en su interior gases inertes como nitrógeno o argón y materiales halógenos como yodo, bromo y cloro. Debido a la reacción entre el tungsteno del filamento (18) y los materiales halógenos (mecanismo de ciclo halógeno), el filamento (18) no se desgastará fácilmente y emitirá una cantidad considerable de calor con un consumo de energía eléctrica menor.

Para emitir mayor cantidad de calor que de luz, la longitud y el grosor del filamento (18) de la resistencia halógena (14) deben ser mayores que los usados en las lámparas halógenas comunes. Para aumentar la radiación infrarroja, la superficie del tubo de cristal de cuarzo (16) puede recubrirse de materiales de radiación infrarroja. Alrededor de la resistencia halógena (14) se coloca un material aislante (20) para impedir que el cuerpo principal (8) se caliente o derrita.

Por consiguiente, al pulsar el interruptor (12), el ventilador (11) empieza a girar y la resistencia halógena (14) empezará a emitir calor y radiación infrarroja. A continuación, el aire calentado saldrá por la abertura de salida (6) impulsado por el ventilador (11). Además, por la abertura de salida (6) se radiarán los rayos infrarrojos generados por la resistencia halógena (14) que calentarán los objetos colocados delante de la abertura de salida (6). Los rayos infrarrojos tienen una permeabilidad tan alta que pueden transportar el calor a la capa interna del cabello, difícilmente alcanzable sólo por convección. Por tanto, si se usa el secador de pelo halógeno de la invención, el cabello se secará de forma más rápida. Los rayos infrarrojos lejanos generados por la resistencia halógena (14) afectarán positivamente a la salud del cabello, pudiendo evitar de este modo las enfermedades del cuero cabelludo.

El secador de pelo halógeno de la invención

incluye la resistencia halógena (14) con un rendimiento energético mayor que la resistencia de Ni-Cr convencional, reduciendo el consumo de energía eléctrica en un 30-40 por ciento. Además, dado que el secador de pelo halógeno de la invención usa como medio de transporte del calor tanto la radiación de rayos infrarrojos como el flujo de aire caliente por convección de calor, la capa interna del cabello, a la que no llega el aire caliente por convección, se calentará y secará rápidamente. Por tanto, se mejora considerablemente la eficiencia del secado. Se consigue

también un efecto protector frente a enfermedades del cuero cabelludo mediante la radiación infrarroja.

Como se menciona arriba, la invención proporcionará un nuevo tipo de secador de pelo halógeno que, en lugar de la resistencia convencional, usa una resistencia halógena que emite radiación infrarroja e infrarroja lejana, de modo que se reducen el tiempo necesario para el secado del cabello y el consumo de energía, además de mantener sanos el cabello y el cuero cabelludo.

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Fig.2

