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7 Attorneys for Plaintiff ALTAIR INSTRUMENTS,  
INC.

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9 UNITED STATES DISTRICT COURT  
10 CENTRAL DISTRICT OF CALIFORNIA

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12 ALTAIR INSTRUMENTS, INC., a  
California corporation,  
13  
Plaintiff,  
14  
vs.  
15  
16 CONAIR CORPORATION, a Delaware  
corporation; and DOES 1 through 10,  
17  
Defendants.

Case No. 2:17-CV-05172-RSWL-PLA  
**FIRST AMENDED COMPLAINT  
FOR PATENT INFRINGEMENT  
DEMAND FOR JURY TRIAL**

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19 Plaintiff ALTAIR INSTRUMENTS, INC. (“Altair”) as its First Amended  
20 Complaint against defendant CONAIR CORPORATION (“Conair”) and Does 1  
21 through 10, inclusive (collectively, “defendants”) alleges as follows:

22

**JURISDICTION AND VENUE**

23

1. This is an action for patent infringement arising under the Patent Laws  
24 of the United States, Title 35, United States Code. This Court has jurisdiction over  
25 the subject matter of this action pursuant to 28 U.S.C. § 1338(a) (action arising  
26 under an Act of Congress relating to patents) and 28 U.S.C. § 1331 (federal  
27 question).

28

2. Venue is proper in this judicial district pursuant to 28 U.S.C. § 1400(b).

1 On information and belief, Conair has committed acts of infringement in this  
2 judicial district by making, selling, offering to sell and/or using in this judicial  
3 district the accused product described below. Additionally, Conair has a regular and  
4 established place of business in this judicial district.

5 3. Conair has filed a Statement of Information with the California  
6 Secretary of State in which Conair states that it has a principal business office in  
7 California, located at 500 North Nash Street, El Segundo, which is in this judicial  
8 district. Conair has a registered agent for service of process located in this judicial  
9 district. Conair regularly attends, including within the past several years, industry  
10 trade shows in this judicial district for the purpose of promoting and selling its  
11 products. Conair currently has, and has held for several years, in Importers license  
12 issued by the California Bureau of Home Furnishings and Thermal Insulation. On  
13 information and belief, Conair has distributors in this judicial district, including for  
14 the accused product identified below.

15 **THE PARTIES**

16 4. Plaintiff Altair is a California corporation with its principal place of  
17 business at 1834 Palma Drive, Suite F, Ventura, California 93003.

18 5. On information and belief, Conair is a Delaware corporation with a  
19 principal business office in California located at 500 Nash Street, El Segundo.

20 6. The true names and capacities, whether individual, corporate, associate  
21 or otherwise, of defendants DOES 1 through 10, inclusive, are unknown to Altair,  
22 which therefore sues said defendants by such fictitious names. Altair will seek leave  
23 of this Court to amend this Complaint to include their proper names and capacities  
24 when they have been ascertained. Altair is informed and believes, and based  
25 thereon alleges, that each of the fictitiously named defendants participated in and are  
26 in some manner responsible for the acts described in this Complaint and the damage  
27 resulting therefrom.

28 7. Altair alleges on information and belief that each of the defendants

1 named herein as Does 1 through 10, inclusive, performed, participated in, or abetted  
2 in some manner, the acts alleged herein, proximately caused the damages alleged  
3 hereinbelow, and are liable to Altair for the damages and relief sought herein.

4 8. Altair alleges on information and belief that, in performing the acts and  
5 omissions alleged herein, and at all times relevant hereto, each of the defendants  
6 was the agent and employee of each of the other defendants and was at all times  
7 acting within the course and scope of such agency and employment with the  
8 knowledge and approval of each of the other defendants.

9 **GENERAL ALLEGATIONS**

10 9. On June 5, 2001, United States Patent No. 6,241,739, entitled  
11 “Microdermabrasion Device And Method Of Treating The Skin Surface” (“the ‘739  
12 patent”), was duly and legally issued by the United States Patent and Trademark  
13 Office (the “USPTO”).

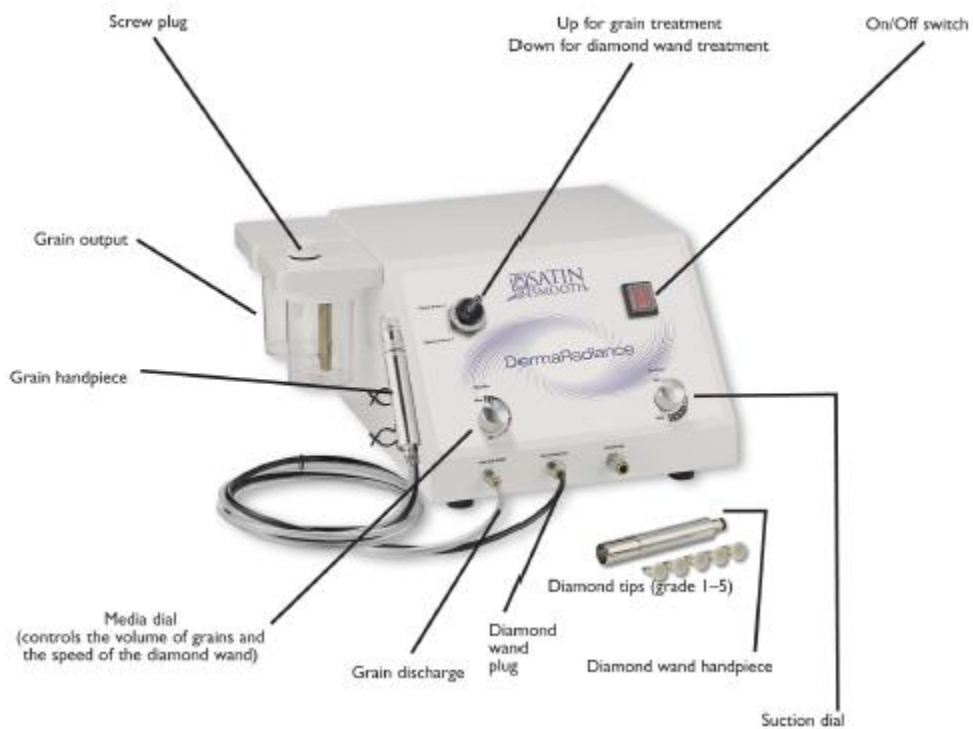
14 10. By assignment, Altair is the owner of all rights, title and interest in and  
15 to the ‘739 patent, including all rights to recover for any and all past infringement  
16 thereof. A true and correct copy of the ‘739 patent, with Reexamination  
17 Certificates, is attached hereto as **Exhibit “A.”**

18 11. On October 16, 2014, Altair, through its counsel, sent a copy of the  
19 ‘739 patent to defendants. Therefore, defendants have had actual knowledge of the  
20 ‘739 patent since at least October 16, 2014. Altair has given notice to the public of  
21 its patent by marking its own products and product literature with the ‘739 patent in  
22 conformity with 35 U.S.C. § 287(a).

23 **SUMMARY OF DEFENDANTS’ INFRINGING ACTS**

24 12. Defendants make, use, sell, offer to sell and/or import a  
25 microdermabrasion device called “DermaRadiance.” Images of the device and the  
26 component parts thereof taken from documents available on defendants’ website are  
27 shown below.  
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### DermaRadiance



### Disposable Dense Filter

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**Metal Diamond Handpiece**

13. The DermaRadiance includes all of the elements of several claims of the ‘739 patent, including at least the claims discussed below.

14. The chart below addresses how every element of **claim 1** of the ‘739 patent is met by the DermaRadiance device:

**CLAIM 1**

<p>A device for removing the epidermis without damaging the dermis of the skin in a microdermabrasion procedure comprising:</p>	<p>The DermaRadiance is used to remove the epidermis without damaging the dermis in a microdermabrasion procedure.</p>
<p>a source of a vacuum, and</p>	<p>The DermaRadiance includes a source of vacuum.</p>
<p>a tube with a treatment tip thereon for removing cells comprising the epidermis layer of the skin surface being treated,</p>	<p>The “metal diamond handpiece” shown above constitutes a tube with a treatment tip thereon for removing cells comprising the epidermis layer.</p>

1 2 3 4	the treatment tip having an abrasive material permanently attached to an operating end thereof to provide a treatment delivery surface,	The treatment tip has an abrasive material permanently attached to an operating end thereof to provide a treatment delivery surface.
5 6 7	the treatment delivery surface having an orientation fixed in regard to an axis extending longitudinally through the tube,	The treatment delivery surface has an orientation fixed in regard to an axis extending longitudinally through the tube.
8 9 10 11	the tube being attached to the source of vacuum so that a lumen through the tube has a reduced pressure therein which is less than the ambient pressure surrounding the tube,	The tube is attached to the source of vacuum so that a lumen through the tube has a reduced pressure therein which is less than the ambient pressure surrounding the tube.
12 13 14 15	the treatment delivery surface having one or more openings therein for continuously applying the reduced pressure within the tube through substantially all said one or more openings to a skin surface,	The treatment delivery surface has an opening (the opening between the sleeve and the insert). The opening is to allow for continuously applying the reduced pressure within the tube through the opening to a skin surface.
16 17 18 19	said continuously applied vacuum causing the skin being treated to have an increased area of contact with the abrasive material permanently attached to the treatment tip,	The continuously applied vacuum causes the skin being treated to have an increased area of contact with the abrasive material permanently attached to the treatment tip.
20 21 22	the vacuum also functioning to collect epidermis cells of the skin surface being treated.	The vacuum also functions to collect epidermis cells of the skin surface being treated.

23 15. The chart below addresses how every element of **claim 9** of the '739  
24 patent is met by the DermaRadiance device:

25 **CLAIM 9**

26 27 28	A tubular device for performing microdermabrasion of a skin surface so	The DermaRadiance includes a tubular device for performing
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1	as to remove the epidermis without	microdermabrasion to remove the
2	damaging the dermis comprising:	epidermis without damaging the dermis.
3	a tube with a lumen there through, the	The “metal diamond handpiece”
4	tube having a first end with an abrasive	constitutes a tube with a lumen there
5	surface provided by an abrasive material	through. A first end of the tube has an
6	permanently attached thereto,	abrasive material that is permanently
7	the first end having one or more	attached thereto.
8	openings in the abrasive surface, said	The first end has an opening in the
9	abrasive surface being at a fixed	abrasive surface, which is the gap
10	orientation to an axis through the lumen,	between the sleeve and the insert.
11	and means on a second end of the tube	abrasive surface is at a fixed orientation
12	for attachment to a source of a vacuum	to an axis through the lumen.
13	which continuously provides a negative	The DermaRadiance includes means on
14	pressure through said one or more	a second end of the tube for attachment
15	openings in the abrasive surface	to the source of vacuum. The vacuum
16	substantially simultaneously to a skin	continuously provides a negative
17	surface to be treated,	pressure through the opening
18	said vacuum causing increased contact	substantially simultaneously to the skin
19	between the skin surface and the	surface.
20	abrasive material attached to said	The vacuum causes increased contact
21	surface of the first end.	between the skin surface and the
22		abrasive material.

19 16. The chart below shows how every element of **claim 16** of the ‘739  
 20 patent is met by the DermaRadiance device:

21 **CLAIM 16**

22	A microdermabrasion wand assembly	The DermaRadiance includes a
23	for controlled removal in a	microdermabrasion wand assembly (i.e.,
24	microdermabrasion process of outer	the “metal diamond handpiece”) for
25	layers of skin comprising the epidermis	controlled removal in a
26	without the use of a separately applied	microdermabrasion process of outer
27	abrasive material comprising:	layers of skin comprising the epidermis
28		without the use of a separately applied
		abrasive material.

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<p>a hollow tubular wand having an abrasive material permanently attached to an operative end of said tubular wand,</p>	<p>The DermaRadiance includes a hollow tubular wand having an abrasive material permanently attached to an operative end. (i.e., the metal diamond handpiece).</p>
<p>a lumen extending through the length of the tubular wand providing a flow channel from one or more openings in the operative end of the tubular wand to a vacuum attachment end of the tubular wand,</p>	<p>A lumen extends through the length of the tubular wand providing a flow channel from an opening in the operative end (i.e., the gap between the operative end of the sleeve and the insert) of the tubular wand to a vacuum attachment end of the tubular wand.</p>
<p>the one or more openings in the operative end of the wand being oriented for continuous contact with the skin surface to increase the area of skin contact with the operative end during use thereof in abrasively removing the epidermis layer of skin without damaging the dermis,</p>	<p>The opening in the operative end is oriented for continuous contact with the skin surface to increase the area of skin contact with the operative end during use in abrasively removing the epidermis layer of skin without damaging the dermis.</p>
<p>a source of a vacuum operatively attached to the vacuum attachment end of the tubular wand by a conduit connecting there between such that the vacuum provided by the vacuum source is applied through the lumen to the one or more openings in the operative end,</p>	<p>The DermaRadiance includes a source of a vacuum operatively attached to the vacuum attachment end of the tubular wand by a conduit connecting there between such that the vacuum provided by the vacuum source is applied through the lumen to the opening in the operative end.</p>
<p>a valve interposed between the source of vacuum and the operative end, said valve operating to vary the level of vacuum applied through the one or more openings in the operative end, and</p>	<p>The DermaRadiance includes a valve interposed between the source of vacuum and the operative end. The valve operates to vary the level of vacuum applied through the opening in the operative end.</p>
<p>a filter interposed in the conduit between the source of vacuum and the operative end.</p>	<p>The DermaRadiance includes a “Disposable Dense Filter” (shown above) interposed in the conduit</p>



1 between the source of vacuum and the  
 2 operative end.

3 17. The chart below shows how every element of **claim 12**, a method  
 4 claim, of the ‘739 patent is met by a user of the DermaRadiance device:

5 **CLAIM 12**

<p>6 A method of performing              7 microdermabrasion of a skin surface              8 of a patient to remove cells comprising              9 the epidermis and reduce undesirable              skin blemishes comprising</p>	<p>A user of the DermaRadiance              performs microdermabrasion of a skin              surface of a patient to remove cells              comprising the epidermis and reduce              undesirable skin blemishes.</p>
<p>10 providing a tubular treatment tool with              11 a skin contacting surface having an              12 abrasive material permanently              13 attached to the end thereof, the skin              14 contacting surface being non-              rotational during use,</p>	<p>The DermaRadiance includes a tubular              treatment tool (“metal diamond              handpiece”) with a skin contacting              surface having an abrasive material              permanently attached to the end              thereof. The skin contacting surface is              non rotational during use.</p>
<p>15 providing through a lumen within the              16 tubular treatment tool and one or more              17 holes in the end of said tool a pressure              18 which is less than ambient pressure              surrounding the treatment tube, and</p>	<p>The DermaRadiance provides through              a lumen within the tubular treatment              tool and the opening between the              sleeve and the insert a pressure which              is less than ambient surrounding              pressure.</p>
<p>20 bringing the end of the skin contacting              21 surface having an abrasive material              22 permanently attached thereto into              23 contact with the skin surface to be              24 treated while said lesser pressure is              25 delivered to the skin surface through              the one or more holes in contact with              the skin surface in the end of said tool,              and</p>	<p>A user of the DermaRadiance brings              the end of the abrasive skin contacting              surface into contact with the skin              surface while said lesser pressure is              delivered to the skin surface through              the opening in the end of said tool.</p>
<p>26 moving the abrasive material on the              27 skin contacting surface across the skin</p>	<p>The abrasive material on the skin              contacting surface is moved across the</p>

1 surface so as to remove epidermal  
2 cells without injuring the dermis.

skin surface to remove epidermal cells  
without injuring the dermis.

3 18. Several of the dependent claims are also met by the DermaRadiance  
4 device. For example, dependent claims 2, 3, 5, 6, 8, 10, 13, 14, 17 and 18 are met  
5 by the DermaRadiance.

6 19. Altair contends that the DermaRadiance infringes at least the claims  
7 discussed above. Altair reserves its right to assert infringement of additional claims.  
8 Altair contends that the DermaRadiance infringes the claims identified above  
9 literally. However, to the extent any of the elements of any of the claims are not  
10 met literally, Altair reserves its right to assert infringement under the doctrine of  
11 equivalents.

### 12 **CLAIM FOR RELIEF**

#### 13 **(Infringement of the '739 Patent)**

14 20. Altair realleges each and every allegation set forth in paragraphs 1  
15 through 19 above, and incorporates them herein.

16 21. Defendants make, use, sell, offer to sell, and/or import into the United  
17 States, including in this judicial district, one or more microdermabrasion devices,  
18 including one known as "DermaRadiance" (the "Accused Devices") which contain  
19 each and every element of at least the claims identified above.

20 22. Defendants' sale of the Accused Devices directly infringes at least  
21 claims 1, 2, 3, 5, 6, 8, 9, 10, 16, 17 and 18 of the '739 patent. Users of the Accused  
22 Devices, including defendants, also infringe the above-referenced claims as well as  
23 the method claims, i.e., claims 12, 13 and 14.

24 23. Defendants are liable for inducing infringement. Defendants are and  
25 have been aware of the '739 patent, and provide the Accused Devices with  
26 instructions for use knowing that such use constitutes infringement of the '739  
27 patent. Defendants are also liable for contributory infringement because the  
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1 Accused Devices constitute an apparatus for use in practicing the claims of the ‘739  
2 patent, defendants know such use constitutes infringement of the ‘739 patent and the  
3 Accused Devices constitute a material part of the inventions and are not a staple  
4 article or commodity of commerce suitable for substantial noninfringing use.

5 24. On information and belief defendants infringement will continue unless  
6 enjoined by this Court.

7 25. On October 16, 2014, Altair’s counsel sent a copy of the ‘739 patent to  
8 defendants. Therefore, defendants had actual knowledge of the ‘739 patent since at  
9 least October 16, 2014. As of October 16, 2014, the ‘739 patent was involved in an  
10 ongoing reexamination proceeding at the USPTO. On July 15, 2015, the USPTO  
11 concluded the reexamination and issued a Reexamination Certificate. Despite  
12 defendants’ knowledge of the ‘739 patent, defendants continued to infringe such  
13 patent. On information and belief, defendants have been and are currently aware of  
14 the ‘739 patent and have been and are aware that the sale, offer to sell and use of the  
15 Accused Devices infringes the ‘739 patent. Despite this knowledge, defendants  
16 continue to infringe the ‘739 patent.

17 26. Defendants’ infringement of the ‘739 patent has been and will continue  
18 to be willful, wanton and deliberate with full knowledge and awareness of Altair’s  
19 patent rights, unless enjoined by this Court.

20 27. Altair has been damaged in an amount to be determined at trial, but  
21 which is no less than a reasonable royalty, and has been irreparably injured by  
22 defendants’ infringing activities. Altair will continue to be so damaged and  
23 irreparably injured unless such infringing activities are enjoined by this Court.

24 **PRAYER**

25 WHEREFORE, Altair prays for the following relief:

- 26 a. Preliminary and permanent injunctions pursuant to  
27 35 U.S.C. § 283 enjoining and restraining defendants, their officers,  
28 directors, agents, employees, successors and assigns, and all those

1 acting in privity or concert with defendants or any of them, from  
2 further infringement of the '739 patent;

3 b. A judgment by the Court that defendants have infringed  
4 and are infringing the '739 patent;

5 c. An award of damages for infringement of the  
6 '739 patent, together with prejudgment interest and costs, said  
7 damages to be trebled by reason of the intentional and willful nature  
8 of defendants' infringement, as provided by 35 U.S.C. § 284;

9 d. An award of Altair's reasonable attorneys' fees pursuant  
10 to 35 U.S.C. § 285 in that this is an exceptional case;

11 e. Altair's costs of suit herein; and

12 f. For such other and further relief as this Court deems just  
13 and proper.

14 Dated: July 25, 2017

RUTAN & TUCKER, LLP  
RONALD P. OINES  
BENJAMIN DEMING  
KATHRYN DOMIN

17 By: /s/ Ronald P. Oines  
18 Ronald P. Oines  
19 Attorneys for Plaintiff ALTAIR  
20 INSTRUMENTS, INC.

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**DEMAND FOR JURY TRIAL**

Altair hereby demands a trial by jury.

Dated: July 25, 2017

RUTAN & TUCKER, LLP  
RONALD P. OINES  
BENJAMIN DEMING  
KATHRYN DOMIN

By: /s/ Ronald P. Oines  
Ronald P. Oines  
Attorneys for Plaintiff ALTAIR  
INSTRUMENTS, INC.

# **EXHIBIT A**

(12) **United States Patent**  
**Waldron**

(10) **Patent No.:** **US 6,241,739 B1**  
 (45) **Date of Patent:** **Jun. 5, 2001**

(54) **MICRODERMABRASION DEVICE AND METHOD OF TREATING THE SKIN SURFACE**

(75) Inventor: **Stephen H. Waldron**, Camarillo, CA (US)

(73) Assignee: **Altair Instruments, Inc.**, Camarillo, CA (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.

(21) Appl. No.: **09/440,020**

(22) Filed: **Nov. 12, 1999**

(51) **Int. Cl.**<sup>7</sup> ..... **A61B 17/50**

(52) **U.S. Cl.** ..... **606/131**

(58) **Field of Search** ..... 606/131; 600/562, 600/569

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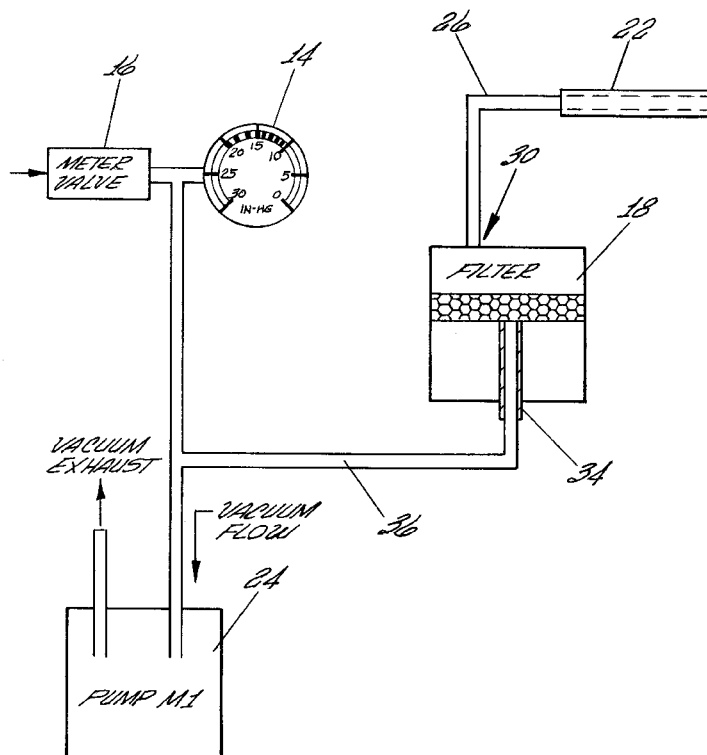
*Primary Examiner*—Jeffrey A. Smith

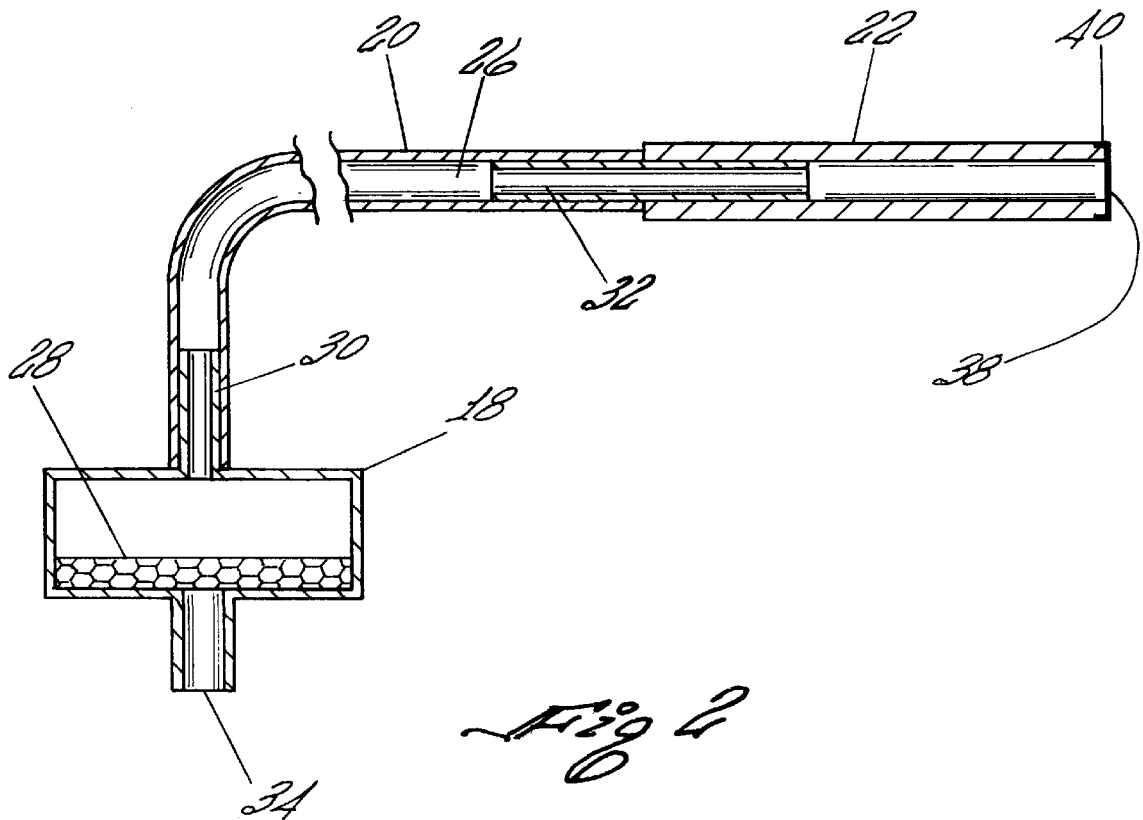
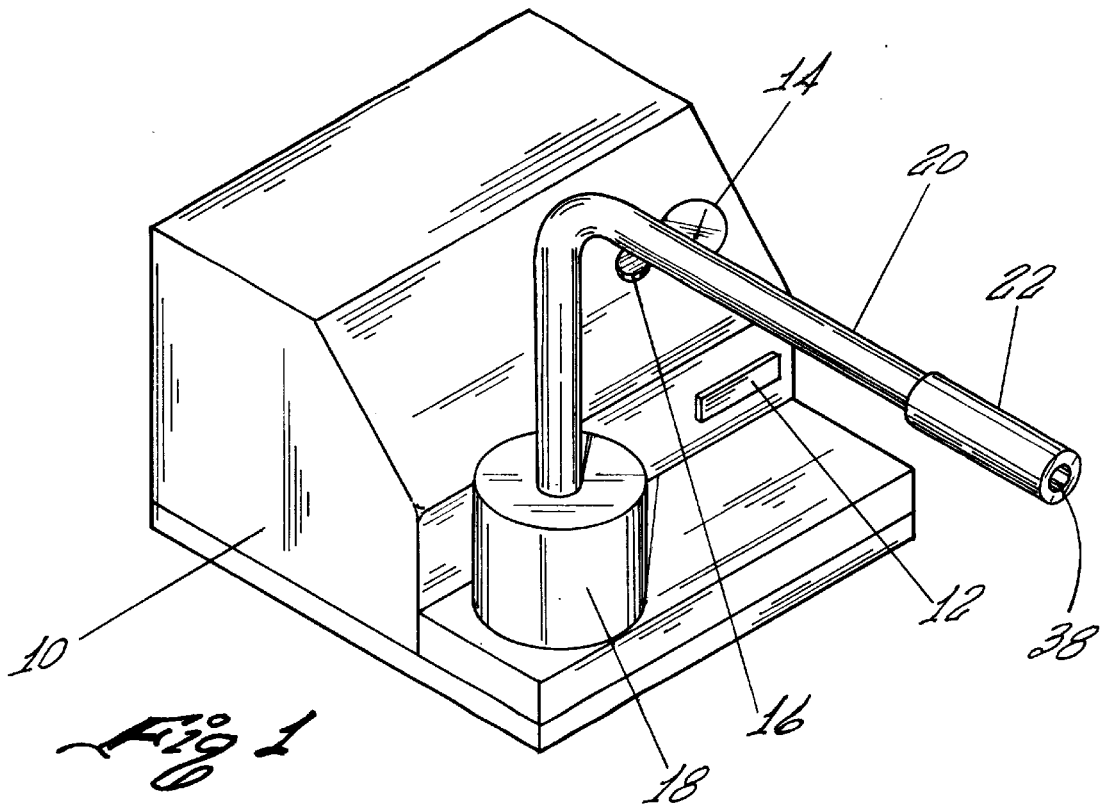
(74) *Attorney, Agent, or Firm*—Michael J. Ram; Koppel & Jacobs

(57) **ABSTRACT**

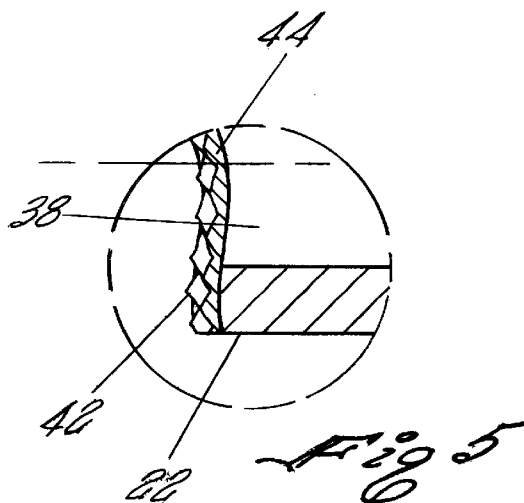
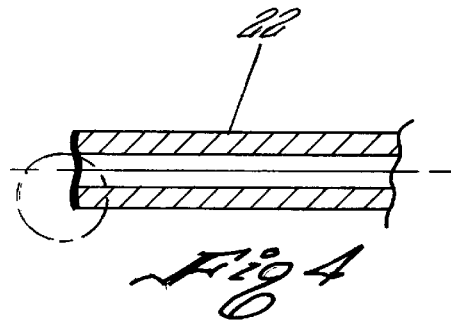
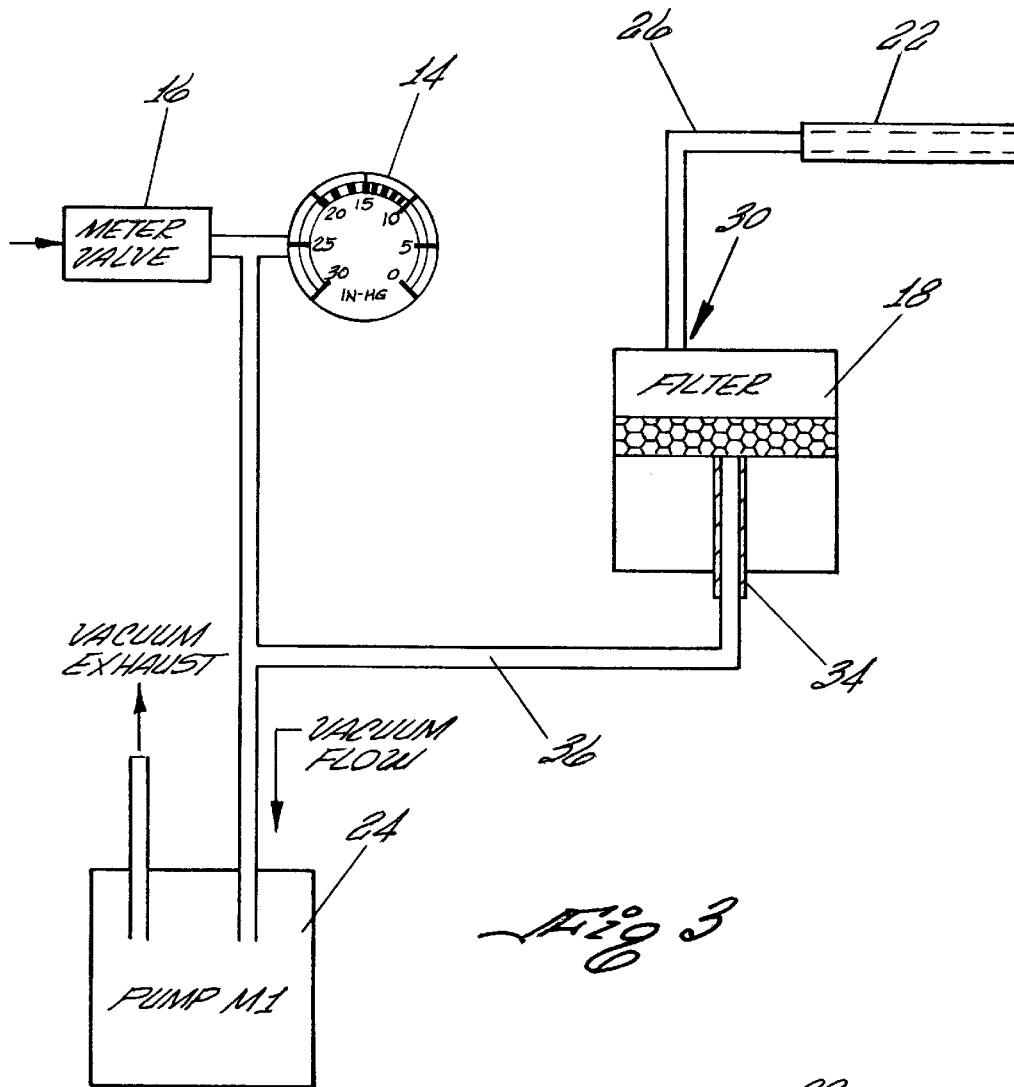
This invention provides a treatment tool and tissue collection system, for remove of outer layers of skin to provide a revitalized, fresh skin surface, and a method of using same, comprising an abrasive tipped tool mounted on the end of a tube, said tube being connected to a source of vacuum. The vacuum aids in maintaining intimate contact between the abrasive tip and the skin during the treatment process and transports the removed tissue to a collection container.

**15 Claims, 4 Drawing Sheets**









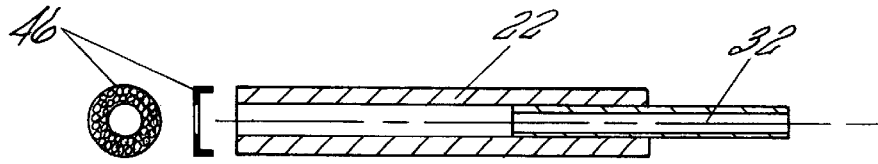


Fig 6B

Fig 6A

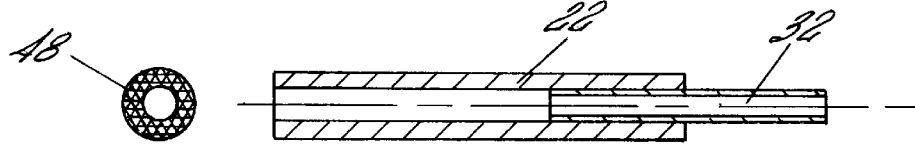


Fig 7B

Fig 7A

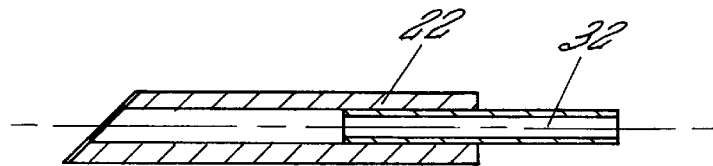


Fig 8

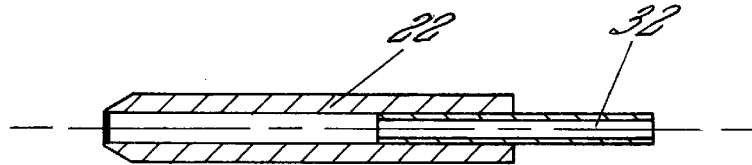


Fig 9

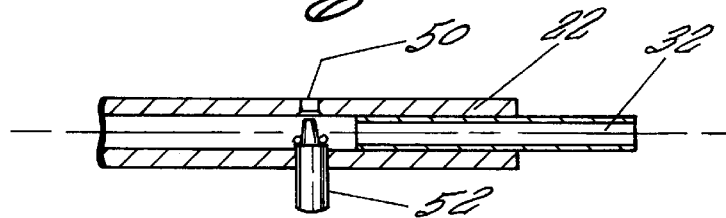


Fig 10

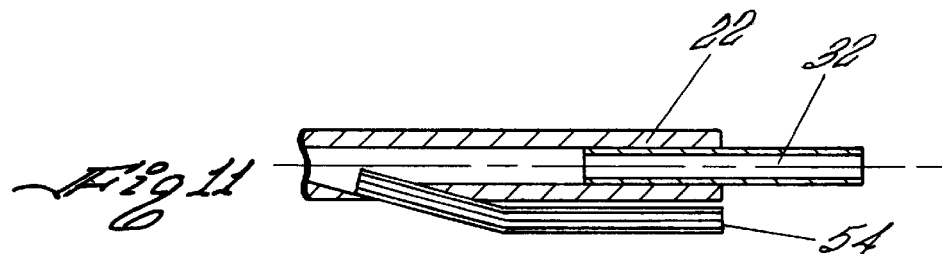
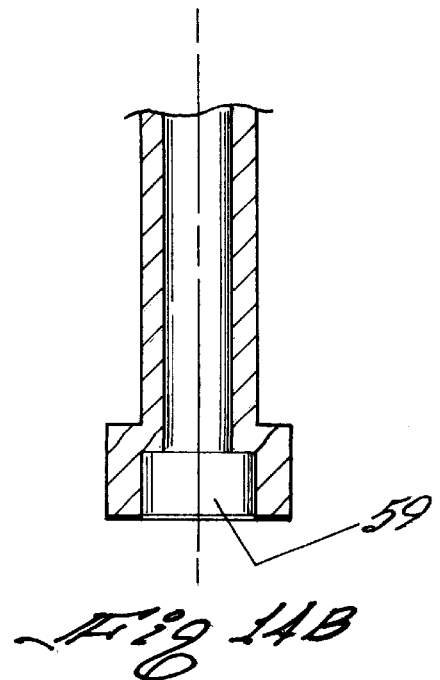
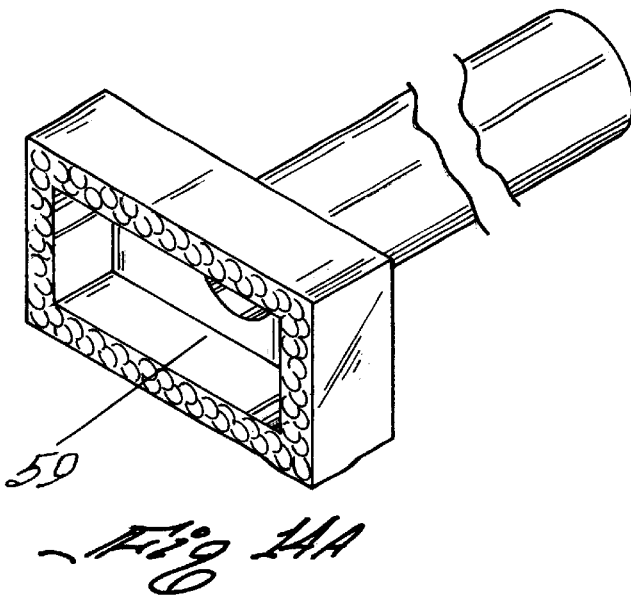
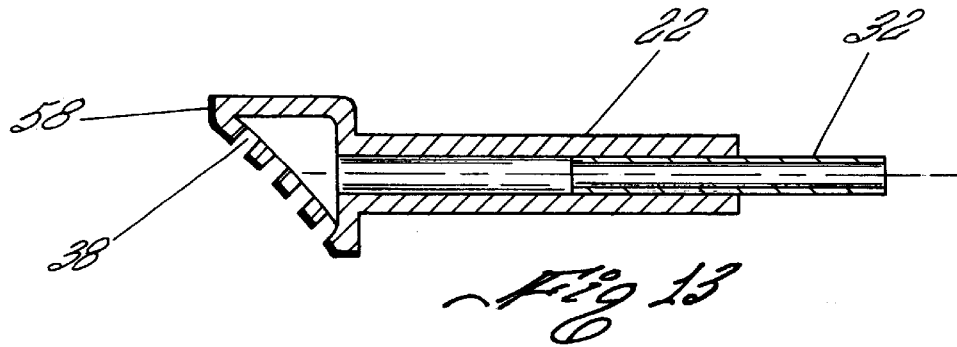
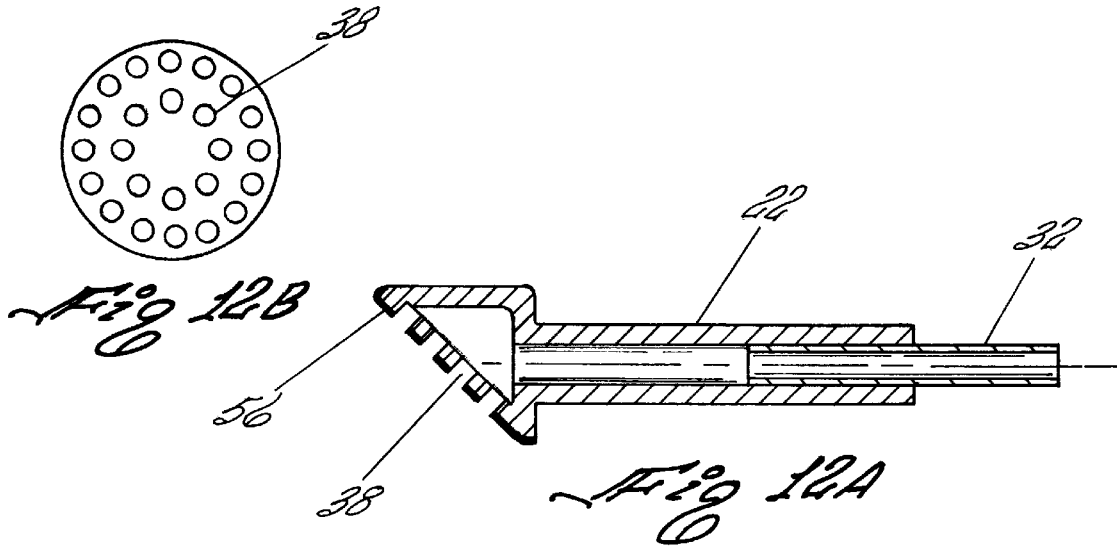


Fig 11



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## MICRODERMABRASION DEVICE AND METHOD OF TREATING THE SKIN SURFACE

### BACKGROUND OF THE INVENTION

This invention provides a treatment tool and tissue collection system for remove of outer layers of skin to provide a revitalized, fresh skin surface. This objective is to remove dead and old skin cells without damaging the remaining skin surface and without the use of powdered abrasive materials because these materials may result in undesirable side effects.

### DESCRIPTION OF THE PRIOR ART

Dermabrasion, also referred to as microdermabrasion, is a process for removal of dead cells from the outermost layer of the skin, referred to as the epidermis, clean out blocked pores, and enhance skin tone. Additionally, the margins of acne scars and other traumatic scars can be erased and aging spots and sun damaged skin can be polish off. This must be accomplished without injuring the lower two layers, namely, the dermis and the subcutaneous layer or lower dermis. Typically, the skin surface is treated a minimum of 5 times spaced 7 to 10 days apart. This is then followed by periodic maintenance sessions. The benefits are:

1. poor, dull skin is enhanced by a gentle resurfacing of the superficial skin layers,
2. expression lines typically seen on the forehead and around the mouth are softened,
3. fine, crepey lines on the cheeks, generally caused by aging and sun damage are reduced,
4. pigment changes and skin discoloration are reduced,
5. enlarged pores are reduced and clogged pores typical in acne conditions are exfoliated and cleaned out, and
6. margins of superficial acne marks, stretch marks, burn scars and surgical scars can be smoothed.

Use of abrasion techniques can be traced back to the ancient Egyptians who used alabaster and pumice to remove blemishes and rough spots and to make the skin smooth and soft. More recently, abrasive tipped devices or rotating brushes and cylinders coated with abrasive particles, such as diamond dust, have been used to remove skin layers (U.S. Pat. Nos. 2,712,823; 2,867,214; 2,881,763; 2,921,585). U.S. Pat. No. 5,800,446 describes a stick, glove finger tip or glove palm coated with an abrasive material which is rubbed over the skin surface to provide a polishing action. U.S. Pat. No. 3,964,212 directed to a pneumatic grinding machine for flat surfaces, incorporates a rotating grinding tool enclosed in a housing with air flowing over the surface to collect dust created by the grinding operation. U.S. Pat. No. 4,378,804 is directed to a skin abrasion device which uses flowing water to rotate an abrasive brush and create a vacuum to remove loosened skin particles. The rotating brush is usually used in conjunction with a liquid detergent or medicinal compound applied to the skin surface being scrubbed. Chemicals, ultrasonic oscillating tips (U.S. Pat. No. 5,012,797) and lasers have also been used for a more aggressive abrasion. U.S. Pat. No. 5,037,431 describes the use of a pressurized jet of a liquid, such as water or sterile saline, to fragment and remove diseased tissue without harming surrounding healthy tissue. This device operates in conjunction with vacuum aspiration to remove the liquid and fragmented tissue.

The present trend is to abrade the skin surface using powdered aluminum oxide or a liquid topical composition

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containing suspended aluminum oxide (U.S. Pat. No. 4,957,747). U.S. Pat. No. 5,037,432 provides for the pressurized delivery, using compressed air, of a powdered, abrasive substance and the removal of the abrasive substance and loosened skin tissue using a vacuum. The abrasive substance is typically microcrystals of quartz, metal, or aluminum oxide. The powdered abrasive is blown through a wand which has a hole in the skin contact end to provide access of the abrasive to the skin surface being treated. An alternative is to cause the aluminum oxide powders to flow by applying a vacuum to the exhaust side of a container holding the abrasive powder and entraining the powder in a flowing gas stream. The powder is then drawn by the vacuum through a treatment tool, across the skin surface to abrade or rub off the epidermis and then recovered along with the skin particles in a collection chamber (U.S. Pat. Nos. 5,100,412; 5,207,234; 5,810,842). This process is similar to "bead-blasting". A potential disadvantage of all of these techniques is that particles can be lodged in the skin and a substantial amount of aluminum oxide and cells, which have to be properly disposed of, may be left behind on or in the skin.

While no toxic effects have been shown from aluminum oxide left on or in the skin, this material has been shown to cause inflammatory changes to the lungs in workers who have inhaled aluminum oxide. (Schwarz, Y, et al., "Evaluation of Workers Exposed to Dust Containing Hard Metals and Aluminum Oxide" *Am J of Ind Med*, 34(20;177-82) August 1999). Also, the eyes must be protected from the highly abrasive dust, which can injure the cornea. Therefore, it is recommended that workers using these devices wear breathing masks and glasses to provide protection from ophthalmic and respiratory damage. Similar protection is suggested for patients being treated. It is also possible that particles of the abrasive material can be left imbedded in the skin surface resulting in long term irritation and provide a situs for bacterial infections.

### SUMMARY OF THE INVENTION

The device for microdermabrasion comprises a hollow tube with an abrasive material permanently attached to a skin contacting end. The abrasive coated tip is moved over the skin surface while a vacuum is applied through the tube to the skin surface to remove cells abraded from the skin surface. The vacuum also causes the skin to be held in intimate contact with the abrasive tip during the treatment procedure.

### DESCRIPTION OF THE FIGURES

FIG. 1 is a schematic drawing of a device incorporating features of the invention.

FIG. 2 is a partial cutaway view of a treatment tube and filter assembly used in the device of FIG. 1.

FIG. 3 is a schematic drawing of the vacuum flow path of the device of FIG. 1.

FIG. 4 is a cutaway side view of the end of the treatment tube.

FIG. 5 is an enlarged view of the circled portion of FIG. 5A.

FIGS. 6A and 7A, are cutaway side views of two different treatment tubes usable with the device of FIG. 1.

FIGS. 6B and 7B are end views of the two different treatment tubes of FIGS. 6A and 7A.

FIG. 8 is a cutaway side view of the end of a sloped treatment tube.

FIG. 9 is a cutaway side view of the end of a tapered treatment tube.

FIG. 10 is a cutaway side view of a valved treatment tube.

FIG. 11 is a cutaway side view of the end of a treatment tube with a second tube for delivery of a supplemental treatment fluid.

FIG. 12A is a side cutaway side view of the end of a treatment tube with an enlarged, sloped end.

FIG. 12B is an end view of the treatment tube of FIG. 12A.

FIG. 13 is a side cutaway side view of the end of a treatment tube with an enlarged, sloped concave end.

FIG. 14A is a view of a rectangular shaped treatment surface with the handle being the conduit for the vacuum.

FIG. 14B is a cutaway side view of the end of a treatment tube with an enlarged, rectangular shaped end.

#### DETAILED DESCRIPTION OF THE INVENTION

The invention provides the capability to perform microdermabrasion without the potential health risks or hazards of using a flowing, powdered metallic substance such as aluminum oxide. This is generally accomplished by the use of a tube having a treatment tip with an abrasive material permanently attached thereto. The term "tube" or "tubular" used herein refers to an elongated hollow structure of any cross section, which includes, but is not limited to, a round, oval, square or rectangle cross section. The abrasive coated end piece, which may also have various different shaped cross sections, may be secured to the treatment tip or be removable and interchangeable. The abrasive tip is rubbed over the skin surface being treated. The tube and related instrumentation also provides a vacuum collection and an optional filter system for collection of the skin cells removed by the procedure, the skin cells being aspirated through a hole or holes in the central portion of the abrasive tip. The vacuum also aids in making an intimate contact between the skin and the abrasive coated tip.

FIG. 1 shows the overall system which comprises a housing 10 which encloses a vacuum pump 24, an ON/OFF switch 12, a gauge 14 to measure the level of vacuum and a valve 16 to adjust the vacuum. While not necessary for operation of the invention, shown mounted on the external surface of the housing 10 is a filter assembly 18. Attached to the filter assembly 18 is a hollow tube or wand assembly 20 upon which the treatment tip 22 is mounted. The other end of the filter assembly 18 is connected to the vacuum pump 24 located inside the housing 10.

FIG. 2 shows the wand assembly 20 comprising tubing 26 connecting the tip 22 and filter assembly 18. Within the filter assembly 18 is a filter pad 28 which collects the loosened skin tissue and prevents the skin tissue or collected body fluids and oils from entering the vacuum pump. The various different tips 22 are discussed in detail herein below. The tubing 26 is flexible so that it is easy to manipulate the tip and to allow ready connection of the wand assembly 20 to an upper hollow extension 30 on the external surface of the filter assembly 18 and a connector tube 32 on the tip. Since the system uses vacuum, the connections are self-sealing.

A lower hollow extension 34 extending from the filter assembly 18 fits into a matching hole on the main housing 10. The filter assembly 18 is easily removable so that it can be replaced after each patient and disposed of. The filtration pad 28 inside the filter housing 18 catches the debris but allows air to easily flow through the pad. The lower hollow extension 34 allows air pulled through the filter assembly 18 to be drawn into the vacuum pump 24.

FIG. 3 shows the flow of the air stream through the vacuum system. It comprising a vacuum pump 24, filter assembly 18, tubing 26 which connects the filter to the treatment tip 22 and vacuum line 36 connecting the filter assembly 18 to the vacuum pump 24. The vacuum pump 24 is operated at a fixed speed to produce a fixed vacuum level. To control the level of vacuum applied through the treatment tip 22 to the skin, a valve 16 vents air into the system, thus reducing the amount of vacuum. Gauge 14 allows the level of vacuum to be monitored. Of course, the vacuum pump can be operated at different speeds to change the level of vacuum applied.

Referring to FIG. 2, a vacuum is applied through the tube 26 to a hole 38 in the treatment tip 22. The tip 22 is brought into contact with skin, the vacuum causing the skin to be pressed against a roughened surface on the end 40 of the treatment tip. As the tube is manually moved across skin the roughened surface abrades the epidermis dislodging cells to flow into the wand assembly 26. The level of abrasion depends on the level of vacuum applied to the treatment tip and the size of the abrasive particles attached to the treatment tip.

FIG. 4 is a side view of the working end of the treatment tube 22. The end of the treatment tube 22 has diamond grit 42 preferably adhered to the end of a metal tube by a plating process using nickel 44 as a binder. The nickel 44 is applied in a controlled manner so that sufficient nickel is present to hold each piece of diamond in place, but yet allow a faceted portion of the diamond to be exposed, the sharp edges of the diamond providing the cutting edges. A diamond particle size of around 0.0035 inches (63–75 microns) produces a smooth and uniform removal of skin surface. However, diamond particles from about 50 to about 150 microns can be used to produce different levels of abrasion, the larger particles removing more skin cells and performing the cell removal more rapidly. However, if the particles are too large the dermis can be damaged and injury to the second and third layers of skin can occur. Very fine particles remove few skin cells and act more in a polishing manner. Other abrasive materials, such as aluminum oxide, can be bonded to the treating tool tip or the tip itself can have a roughened surface cut into the end thereof. Use of an adhered aluminum oxide of about 100 grit (151 $\mu$ ) provides a coarse (aggressive) treatment, and use of about a 120 grit (127 $\mu$ ) material provides a medium level of treatment. Particles with a higher grit (i.e. small size particles) would create more of a polishing effect. Of course, many different hard abrasive materials known to those skilled in the art, such as silicon carbide, silicon oxide, and various metal nitrates can be used in place of the diamond or aluminum oxide.

The dimensions and materials used to construct the wand assembly 20 is not critical. However, a preferred treatment tip 22 is formed from a 12 mm OD stainless steel tube with a 6 mm ID and a diamond coated end. The stainless steel/diamond tool can be steam or chemical sterilized between uses without damage. A first alternative would be to have a single use or single patient tube which is made of plastic, the end being coated with aluminum oxide, or similar abrasive materials. The abrasive can also be adhered with an adhesive. A further alternative would be a tube, which could be stainless steel, plastic or other stiff tubular material, with a suitable removable and replaceable tip or a tip with an abrasive end surface formed by a machining process.

FIG. 6a shows a removable disc 46 sized to fit over the end 40 of the tube 22. The disc 46 has an abrasive end or

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abrasive material attached to its outer end. During the procedure various disc with different abrasive characteristics can be interchanged and at the conclusion of the procedure the disc(s) 46 can be discarded.

The end of the tube can also be made abrasive by machining the surface as shown in FIGS. 7a and 7b in a manner commonly called knurling. Diamond shaped projections 48 are raised on the surface for abrading in any direction. This would be similar to the construction of wood and metal files. The tip as shown in FIG. 7b can also be provided which raised portions tapered and oriented in only one direction, similar to a saw teeth, except the tooth would only be a few thousands of an inch high, to achieve smooth abrading of the surface.

Besides providing different means of abrasion on the end of the treatment tip 22, the contour or shape of the tip can be varied. FIGS. 6a and 7a show a flat end. The flat end can provide a greater surface area in contact with the skin for an aggressive removal of surface cells. A concave surface as shown in FIG. 4, in conjunction with the vacuum applied to the skin surface results in a more uniform cutting surface on the skin. For easier access to difficult to reach locations the roughened ends can be sloped, as shown in FIG. 8, or tapered, rounded or cone shaped, as shown in FIG. 9, to better treat curved surfaces, such as the area between the cheek and the nose.

The device uses a vacuum pump 24 which generates a constant level of vacuum, which is controlled (lessened) by the venting of air into the system by the valve 16 mounted in the housing 10. As an alternative, the full vacuum can be applied to the wand assembly 20. The level of vacuum can then be decreased by air vented into the system through vent hole 50 by adjusting flow control valve 52 mounted on the wand 20 or treatment tube 22, as shown in FIG. 10. The valve 52 can be configured to be a simple on/off control or variable so that suction can be readily adjusted by the operator while performing the procedure.

While the treatment tube can be used alone to abrade the skin and the vacuum system can be configured to primarily pick up the loosened skin cells, it has been found that applying the vacuum through the hole 38 in the end of the treatment tip 40 provides an unexpected advantage. The skin being treated is pulled against the abrasive tip, thus increasing the effectiveness of the tissue abrasion and removal process. Sealing off ambient air raises the level of vacuum and makes the abrasion more aggressive. The concave tip as shown in FIG. 4 is particularly effective when used in conjunction with a vacuum, as it provides a larger surface area for the skin/abrasive material contact.

As a further variation, the treatment tip 22 can have an enlarged abrasive coated end 56, 58 which is flat and sloped or sloped and concave such as shown in FIGS. 12A and 13 respectively. While a single hole 38 in the center of the end 56 may be used for applying the vacuum, the efficacy of the abrasive tip can be improved by using several holes 38 therein FIG. 12B is an end view showing an example of a flat, sloped abrasive tip with multiple openings for application of the vacuum to the skin surface. An end view of the concave tip of FIG. 13 would have a similar appearance. Further, while FIGS. 12A and 13 show the end to be part of the treatment tip 22 it could be a separate removable piece as shown in FIGS. 6a and 6b. These configurations have particular utility in treating large flat body surfaces such as the chest, back and legs of an individual. They can also be used where a large abrasive treatment surface is desired but it is preferential to spread out the applied vacuum so that it

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does not aggressively suck skin into the tip or suck the skin into the tip at a single point.

FIG. 11 shows a second tube 54 mounted on the treatment tip 22. The tube could be used to allow the metered use of chemicals to enhance the abrasion or supply or other liquids to reduce friction.

To use devices embodying the invention the vacuum is applied, through the treatment tool, to the area of the skin to be treated while the abrasive surface, which surrounds the applied vacuum, is moved over the skin surface to be treated. The abrasive tip is typically moved over the skin surface in a circular motion. However, a combination of vertical and horizontal movements of the tip, with or without the circular movements, may also be used to assure that the skin area is uniformly treated. Also, if a particular skin blemish or abnormality is to be treated. The tip motion can be restricted to that particular portion of the skin.

FIGS. 14A and 14B show an elongated treatment end with a large central opening 59 for application of the vacuum to the skin. In this case the device has wide treatment, shaped like a razor, and elongated abrasive areas for debrading flat areas of skin.

While the invention has been shown and described with reference to different embodiments thereof, it will be appreciated by those skilled in the art that variations in form, detail, compositions and operation may be made without departing from the spirit and scope of the invention as defined by the accompanying claims.

For example, the vacuum does not have to be provided by a vacuum pump with controller housing but can be provided by a centrally located vacuum system such as may be available in a hospital or medical facility. However, to prevent contamination of the vacuum system the filter assembly should be provided to collect the tissue removed. The abrasive tip has been described as formed by adhering or attaching an abrasive material thereto or machining the surface of the tip to create a roughened surface. However, one skilled in the art will recognize that there are numerous chemical and mechanical processes to create a roughened surface on the end of the treatment tip sufficient for performing the process described herein.

I claim:

1. A device for removing portions of the outer layers of skin comprising:

a source of a vacuum, and

a tube with an abrasive treatment tip thereon for dislodging cells from a surface being treated, the tube being attached to the source of vacuum so that a lumen through the tube has a reduced pressure therein which is less than the ambient pressure surrounding the tube, the abrasive treatment tip having at least one opening therein for applying the reduced pressure within the tube to a skin surface, said vacuum causing the skin being treated to have an increased area of contact with the abrasive tip, the vacuum also functioning to collect tissue or cells removed from the skin surface being treated.

2. The device of claim 1 wherein the source of vacuum is a vacuum pump enclosed within a housing, the housing have means thereon for monitoring and controlling the level of vacuum delivered.

3. The device of claim 1 further including means for varying the level of reduced pressure applied through the treatment tip.

4. The device of claim 3 wherein the means for varying the level of reduced pressure applied through the treatment tip is a valve mechanism mounted in the treatment tube.

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5. The device of claim 3 wherein the means for varying the level of reduced pressure applied through the treatment tip is a valve mechanism in operative connection to the source of vacuum.

6. The device of claim 1 wherein the abrasive tip has particles of diamond, aluminum oxide, silicon carbide, silicon oxide or metal nitrides attached thereto.

7. The device of claim 1 wherein the abrasive tip has a mechanically or chemically created roughened surface.

8. The device of claim 1 further including a collection filter disposed between the treatment tip and the source of vacuum so that all particulate matter entering the at least one opening in the abrasive treatment tip is collected therein.

9. A tubular device for performing micro-abrasion of a skin surface comprising a tubular device with a lumen there through, the tubular device having a first end with an abrasive surface and means on a second end thereof for attachment to a source of a vacuum to apply a negative pressure to a skin surface to be treated, said vacuum causing increased contact between the skin surface and the abrasive surface.

10. The tubular device of claim 9 wherein the abrasive surface on the first end comprises crystalline diamond pieces permanently secured to said first end.

11. The tubular device of claim 9 wherein the abrasive surface on the first end comprises crystalline aluminum oxide permanently secured to said first end.

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12. A method of treating the skin surface of a patient to remove surface cells and reduce undesirable skin blemishes comprising

providing a tubular treatment tool with an abrasive skin contacting surface,

providing a pressure through a lumen within the tubular treatment tool which is less than ambient pressure surrounding the treatment tube, and

bringing the abrasive skin contacting surface into contact with the skin surface to be treated while said lesser pressure is delivered to the skin surface through the lumen and

moving the abrasive skin contacting surface across the skin surface.

13. The method of claim 12 wherein the abrasive skin contacting surface has an abrasive crystalline material adhered thereto.

14. The method of claim 13 wherein the abrasive crystalline material is selected from the group consisting of crystals of diamond, aluminum oxide, silicon carbide, silicon oxide and metal nitrides.

15. The method of claim 12 wherein the abrasive skin contacting surface is formed by a machining process.

\* \* \* \* \*



US006241739C1

(12) **EX PARTE REEXAMINATION CERTIFICATE (6045th)**  
**United States Patent**  
**Waldron**

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(45) **Certificate Issued:** **Dec. 11, 2007**

(54) **MICRODERMABRASION DEVICE AND METHOD OF TREATING THE SKIN SURFACE**

(75) **Inventor:** **Stephen H. Waldron**, Camarillo, CA (US)

(73) **Assignee:** **Altair Instruments Inc.**, Camarillo, CA (US)

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 Issued: **Jun. 5, 2001**  
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 Filed: **Nov. 12, 1999**

(51) **Int. Cl.**

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**A61B 17/32** (2006.01)  
**A61B 17/00** (2006.01)  
**A61H 9/00** (2006.01)

(52) **U.S. Cl.** ..... **606/131**

(58) **Field of Classification Search** ..... 606/131;  
 600/562, 569

See application file for complete search history.

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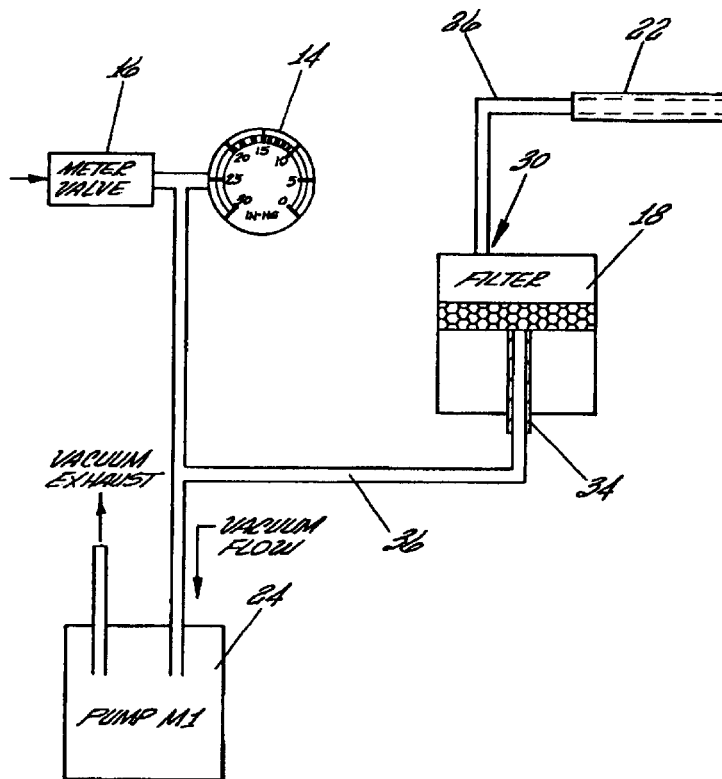
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*Primary Examiner*—Sara S Clarke

(57) **ABSTRACT**

This invention provides a treatment tool and tissue collection system, for remove of outer layers of skin to provide a revitalized, fresh skin surface, and a method of using same, comprising an abrasive tipped tool mounted on the end of a tube, said tube being connected to a source of vacuum. The vacuum aids in maintaining intimate contact between the abrasive tip and the skin during the treatment process and transports the removed tissue to a collection container.





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**EX PARTE  
REEXAMINATION CERTIFICATE  
ISSUED UNDER 35 U.S.C. 307**

THE PATENT IS HEREBY AMENDED AS  
INDICATED BELOW.

**Matter enclosed in heavy brackets [ ] appeared in the patent, but has been deleted and is no longer a part of the patent; matter printed in italics indicates additions made to the patent.**

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims 7 and 15 are cancelled.

Claims 1, 2, 6 and 9–13 are determined to be patentable as amended.

Claims 3–5, 8 and 14, dependent on an amended claim, are determined to be patentable.

New claims 16–18 are added and determined to be patentable.

1. A device for removing portions of the outer layers of skin comprising:

- a source of a vacuum, and
- a tube with [an abrasive] a treatment tip thereon for dislodging cells from a surface being treated, *the treatment tip having an abrasive material permanently attached to an operating end thereof to provide a treatment delivery surface, the treatment delivery surface having an orientation fixed in regard to an axis extending longitudinally through the tube, the tube being attached to the source of vacuum so that a lumen through the tube has a reduced pressure therein which is less than the ambient pressure surrounding the tube, the [abrasive] treatment [tip] delivery surface having [at least one opening] one or more openings therein for continuously applying the reduced pressure within the tube through substantially all said one or more openings to a skin surface, said continuously applied vacuum causing the skin being treated to have an increased area of contact with the abrasive material permanently attached to the treatment tip, the vacuum also functioning to collect tissue or cells removed from the skin surface being treated.*

2. The device of claim 1 wherein the source of vacuum is a vacuum pump enclosed within a housing, the housing [have] having means thereon for monitoring and controlling the level of vacuum delivered.

6. The device of claim 1 wherein the abrasive material permanently attached to the treatment tip [has] comprises particles of diamond, aluminum oxide, silicon carbide, silicon oxide or metal nitrides [attached thereto].

9. A tubular device for performing micro-abrasion of a skin surface comprising a [tubular device] tube with a lumen there through, the [tubular device] tube having a first end with an abrasive surface provided by an abrasive material permanently attached thereto, the first end having one or more openings in the abrasive surface, said abrasive surface being at a fixed orientation to an axis through the lumen, and means on a second end [thereof] of the tube for attachment to a source of a vacuum [to apply] which continuously provides a negative pressure through said one or more

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*openings in the abrasive surface substantially simultaneously to a skin surface to be treated, said vacuum causing increased contact between the skin surface and the abrasive material attached to said surface of the first end.*

10. The tubular device of claim 9 wherein the abrasive material permanently attached to the surface on the first end comprises crystalline diamond pieces [permanently secured to said first end].

11. The tubular device of claim 9 wherein the abrasive material permanently attached to the surface on the first end comprises crystalline aluminum oxide [permanently secured to said first end].

12. A method of treating the skin surface of a patient to remove surface cells and reduce undesirable skin blemishes comprising

15 providing a tubular treatment tool with [an abrasive] a skin contacting surface having an abrasive material permanently attached to the end thereof, the skin contacting surface being non-rotational during use,

19 providing [a pressure] through a lumen within the tubular treatment tool and one or more holes in the end of said tool a pressure which is less than ambient pressure surrounding the treatment tube, and

23 bringing the [abrasive] end of the skin contacting surface having an abrasive material permanently attached thereto into contact with the skin surface to be treated while said lesser pressure is delivered to the skin surface through [the lumen] the one or more holes in contact with the skin surface in the end of said tool, and moving the abrasive material on the skin contacting surface across the skin surface.

13. The method of claim 12 wherein the [abrasive] skin contacting surface has an abrasive crystalline material adhered thereto.

16. A microdermabrasion wand assembly for controlled removal by abrasion of outer layers of skin without the use of a separately applied abrasive material comprising:

- a hollow tubular wand having an abrasive material permanently attached to an operative end of said tubular wand, a lumen extending through the length of the tubular wand providing a flow channel from one or more openings in the operative end of the tubular wand to a vacuum attachment end of the tubular wand, the one or more openings in the operative end of the wand being oriented for continuous contact with the skin surface to increase the area of skin contact with the operative end during use thereof in abrasively removing the layer of skin,

a source of a vacuum operatively attached to the vacuum attachment end of the tubular wand by a conduit connecting there between such that the vacuum provided by the vacuum source is applied through the lumen to the one or more openings in the operative end,

a valve interposed between the source of vacuum and the operative end, said valve operating to vary the level of vacuum applied through the one or more openings in the operative end, and

a filter interposed in the conduit between the source of vacuum and the operative end.

17. The microdermabrasion wand assembly of claim 16 wherein the abrasive material permanently attached is a crystalline material.

18. The microdermabrasion wand assembly of claim 17 wherein the crystalline material is selected from the group consisting of crystals of diamond, aluminum oxide, silicon carbide, silicon oxide and metal nitrides.

\* \* \* \* \*



US006241739C2

(12) **EX PARTE REEXAMINATION CERTIFICATE** (10664th)  
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**Waldron** (10) **Number:** **US 6,241,739 C2**  
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(54) **MICRODERMABRASION DEVICE AND METHOD OF TREATING THE SKIN SURFACE**

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*A61B 17/50* (2006.01)  
*A61B 18/08* (2006.01)  
*A61B 17/00* (2006.01)

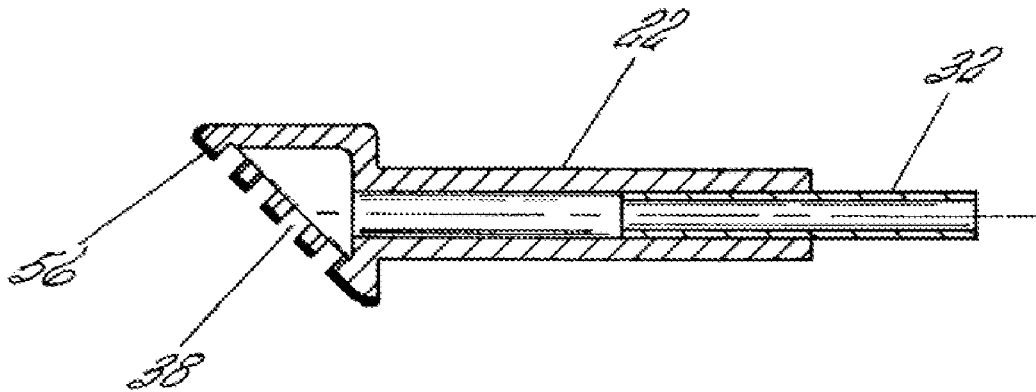
(52) **U.S. Cl.**  
 CPC ..... *A61B 18/082* (2013.01); *A61B 2017/00761* (2013.01)

(58) **Field of Classification Search**  
 None  
 See application file for complete search history.

(56) **References Cited**  
 To view the complete listing of prior art documents cited during the proceeding for Reexamination Control Number 90/013,284, please refer to the USPTO's public Patent Application Information Retrieval (PAIR) system under the Display References tab.

*Primary Examiner* — Beverly M Flanagan

(57) **ABSTRACT**  
 This invention provides a treatment tool and tissue collection system, for remove of outer layers of skin to provide a revitalized, fresh skin surface, and a method of using same, comprising an abrasive tipped tool mounted on the end of a tube, said tube being connected to a source of vacuum. The vacuum aids in maintaining intimate contact between the abrasive tip and the skin during the treatment process and transports the removed tissue to a collection container.



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**EX PARTE  
REEXAMINATION CERTIFICATE**

THE PATENT IS HEREBY AMENDED AS  
INDICATED BELOW.

**Matter enclosed in heavy brackets [ ] appeared in the patent, but has been deleted and is no longer a part of the patent; matter printed in italics indicates additions made to the patent.**

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims 7 and 15 were previously cancelled.

Claims 1, 9, 12 and 16 are determined to be patentable as amended.

Claims 2-6, 8, 10, 11, 13, 14, 17 and 18, dependent on an amended claim, are determined to be patentable.

1. A device for removing [portions of the outer layers] *the epidermis without damaging the dermis of the skin in a microdermabrasion procedure* comprising:

- a source of a vacuum, and
- a tube with a treatment tip thereon for [dislodging] removing cells [from a] *comprising the epidermis layer of the skin* surface being treated, the treatment tip having an abrasive material permanently attached to an operating end thereof to provide a treatment delivery surface, the treatment delivery surface having an orientation fixed in regard to an axis extending longitudinally through the tube, the tube being attached to the source of vacuum so that a lumen through the tube has a reduced pressure therein which is less than the ambient pressure surrounding the tube, the treatment delivery surface having one or more openings therein for continuously applying the reduced pressure within the tube through substantially all said one or more openings to a skin surface, said continuously applied vacuum causing the skin being treated to have an increased area of contact with the abrasive material permanently attached to the treatment tip, the vacuum also functioning to collect [tissue or] *epidermis cells [removed from] of the skin surface* being treated.

9. A tubular device for performing [micro-abrasion] *microdermabrasion* of a skin surface *so as to remove the epidermis without damaging the dermis* comprising a tube with a lumen there through, the tube having a first end with an abrasive surface provided by an abrasive material permanently attached thereto, the first end having one or more openings in the abrasive surface, said abrasive surface being at a fixed orientation to an axis through the lumen, and means on a second end of the tube for attachment to a source of a vacuum

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which continuously provides a negative pressure through said one or more openings in the abrasive surface substantially simultaneously to a skin surface to be treated, said vacuum causing increased contact between the skin surface and the abrasive material attached to said surface of the first end.

12. A method of [treating the] *performing microdermabrasion of a skin surface* of a patient to remove [surface] cells *comprising the epidermis* and reduce undesirable skin blemishes comprising

providing a tubular treatment tool with a skin contacting surface having an abrasive material permanently attached to the end thereof, the skin contacting surface being non-rotational during use,

providing through a lumen within the tubular treatment tool and one or more holes in the end of said tool a pressure which is less than ambient pressure surrounding the treatment tube, and

bringing the end of the skin contacting surface having an abrasive material permanently attached thereto into contact with the skin surface to be treated while said lesser pressure is delivered to the skin surface through the one or more holes in contact with the skin surface in the end of said tool, and

moving the abrasive material on the skin contacting surface across the skin surface *so as to remove epidermal cells without injuring the dermis.*

16. A microdermabrasion wand assembly for controlled removal [by abrasion] *in a microdermabrasion process* of outer layers of skin *comprising the epidermis* without the use of a separately applied abrasive material comprising:

a hollow tubular wand having an abrasive material permanently attached to an operative end of said tubular wand, a lumen extending through the length of the tubular wand providing a flow channel from one or more openings in the operative end of the tubular wand to a vacuum attachment end of the tubular wand, the one or more openings in the operative end of the wand being oriented for continuous contact with the skin surface to increase the area of skin contact with the operative end during use thereof in abrasively removing *the epidermis* layer of skin *without damaging the dermis,*

a source of a vacuum operatively attached to the vacuum attachment end of the tubular wand by a conduit connecting there between such that the vacuum provided by the vacuum source is applied through the lumen to the one or more openings in the operative end,

a valve interposed between the source of vacuum and the operative end, said valve operating to vary the level of vacuum applied through the one or more openings in the operative end, and

a filter interposed in the conduit between the source of vacuum and the operative end.

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