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Declarations under Rule 4.17:

- as to the identity of the inventor (Rule 4.17(i))
- of inventorship (Rule 4.17(iv))

Published:

- with international search report (Art. 21(3))
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))

(88) Date of publication of the international search report:
28 July 2016

(54) Title: AUTOMATED MEASUREMENT AND CONTROL SYSTEM FOR TATTOO DELIVERY.

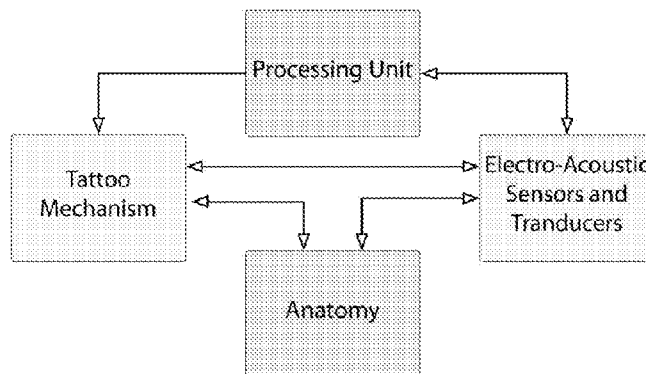
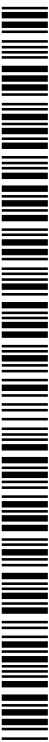


Fig. 6

(57) Abstract: Tattooing, or delivery of pigment into the skin, producing temporary or permanent markings on the skin, is practiced for aesthetic and practical purposes. Human and mechanical control of tattooing may be augmented by sensors, coupled to an adaptive control system capable of improving the results, and relieving demands on the operator.



INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 15/68187

A. CLASSIFICATION OF SUBJECT MATTER
IPC(8) - A61M 37/00 (2016.01)
CPC - A61M 37/0076
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED
Minimum documentation searched (classification system followed by classification symbols)
IPC(8) : A61M 37/00 (2016.01)
CPC : A61M 37/0076

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
IPC(8) : A61M 5/00, 5/46, 5/48; A61B 34/00, 34/30 (2016.01)
CPC: A61M 37/00, 37/0084, 5/00, 5/46, 5/48; A61B 34/00, 34/30

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
Patbase, Google Patent, Google Scholar: tattoo, ink, pigment, color, inject, infuse, deliver, skin, dermal, cutaneous, subcutaneous, sense, detect, observe, measure, assess, determine, deep, depth, distance, control, feedback, arrive, dwell, time, period, control, learn, algorithm, device, machine, tool, instrument, scalp, layer, upper

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X --- Y	US 2008/0033356 A1 (KLUGE et al) 7 February 2008 (07.02.2008) see especially para [0040], [0048]-[0059], [0063], [0066], fig 1, 2	1-8, 10-12, 14 ----- 9, 13
Y	US 2014/0324089 A1 (CHAN et al) 30 October 2014 (30.10.2014) see especially para [0025], [0026], [0027]	9, 13
A	US 2008/0167674 A1 (BODDULURI et al) 10 July 2008 (10.07.2008) see whole document	1-14
A	US 6,890,319 B1 (CROCKER) 10 May 2005 (10.05.2005) see whole document	1-14
A	US 6,341,831 B1 (WEBER et al) 29 January 2002 (29.01.2002) see whole document	1-14

Further documents are listed in the continuation of Box C.

* Special categories of cited documents:
 "A" document defining the general state of the art which is not considered to be of particular relevance
 "E" earlier application or patent but published on or after the international filing date
 "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
 "O" document referring to an oral disclosure, use, exhibition or other means
 "P" document published prior to the international filing date but later than the priority date claimed
 "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
 "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
 "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
 "&" document member of the same patent family

Date of the actual completion of the international search 14 March 2016	Date of mailing of the international search report 30 JUN 2016
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Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-8300	Authorized officer: Lee W. Young PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774
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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 15/68187

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:
--- see continuation sheet ---

1. As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of additional fees.
3. As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:
1-14

- Remark on Protest**
- The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
 - The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
 - No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 15/68187

Box III - Observations where unity of invention is lacking (Continuation of item 3 of first sheet):

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1.

Group I: claims 1-14 directed to a tattooing device sensing a particular depth

Group II: claim 15 directed to a method of delivering a prescribed amount of material through the skin sensing a volume of pigment

Group III: claims 16, 18-20 directed to a method of delivering a prescribed amount of material through the skin adjusting depth and dwell time

Group IV: claim 17 directed to a method of delivering a prescribed amount of material through the skin adjusting cam followers and screw adjusters

Group V: claims 21, 22 directed to a method of delivering a prescribed amount of material through the skin changing the delivery responsive to a signal

The groups of inventions above do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons:

Special Technical Features:

The special technical feature of the Group I claims is sensing a particular depth, which is not present in the claims of Group II-V.

The special technical feature of the Group II claims is sensing a volume of pigment, which is not present in the claims of Group I, III-V.

The special technical feature of the Group III claims is adjusting depth and dwell time, which is not present in the claims of Group I-II, IV-V.

The special technical feature of the Group IV claims is adjusting cam followers and screw adjusters, which is not present in the claims of Group I-III, V.

The special technical feature of the Group V claims is changing the delivery responsive to a signal, which is not present in the claims of Group I-IV.

Common Technical Features

Groups I-V share the technical feature of a tattooing device according to claim 1. This generic feature does not avoid the prior art, as evinced by US 2008/0033356 A1 to Kluge et al (hereinafter Kluge). Kluge teaches a tattooing device (para [0040]) comprising: one or more needles operative for moving pigment from a reservoir to the needle tip(s) for delivering pigment to the upper dermal layer of a selected location in the scalp of a patient (para [0048], [0049], [0053], [0055], fig 1, device 1, needles 6, reservoir 14 suitable for delivering pigment to any selected layer of skin), said device comprising one or more sensors for dynamically sensing changes in skin characteristics as said needle(s) penetrates the skin of the scalp (para [0051], [0053], [0057], electrodes measure skin impedance characteristics which change with depth), said sensor(s) being operative to signal the arrival of the needle tip(s) at the upper dermal layer of the selected location in the upper dermis (para [0051], [0053], [0056], [0057], [0059], [0063], detects signal leap at required depth and effects pigment discharge at the required depth).

Therefore, the listed inventions lack unity of invention under PCT Rule 13 because they do not share a same or corresponding special technical feature.

Regarding claims 14-18, 21-22, these claims appear to be poorly appended to claims 14, 15, 16 respectively. They have been amended as follows:

- references to "The method..." in the preamble have been replaced with "[A] method..."
- references to "a tattoo instrument of claim..." have been replaced with "[the] tattoo instrument of claim [1]"
- references to "a patient's skin of claim..." have been replaced with "[the] patient's skin of claim [1]"