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Declarations under Rule 4.17:

- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))
- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))

(54) Title: FAUCET FOR HANDWASHING FEEDBACK WITH INTEGRATED DISPENSER

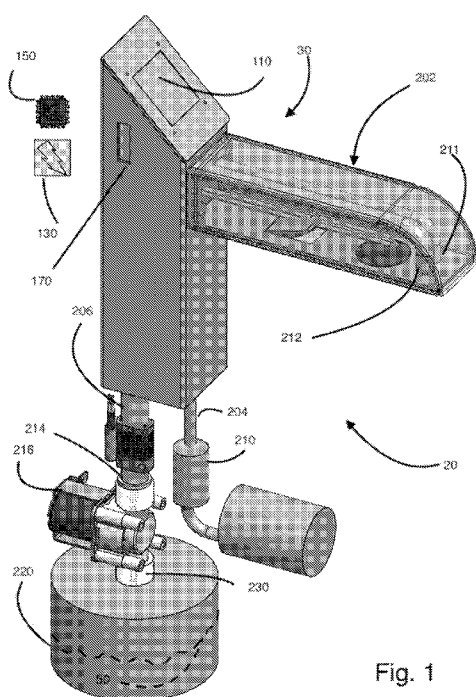


Fig. 1

(57) Abstract: A "smart-faucet" is provided that provides instructions and feedback to a user that improves the efficacy of a handwashing event. The faucet includes a supply of sanitizer that includes a visualization component, such as a fluorescent component, that assists the user in determining sanitizing coverage of the hands. The visualization component may require the presence of an energy source radiating a specific frequency, such as UV, in order to become visible. The faucet may further be able to communicate information to a remote location regarding supply data necessary to insure just in time delivery of a replacement supply of sanitizer.

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- *with international search report (Art. 21(3))*
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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 21/43049

A. CLASSIFICATION OF SUBJECT MATTER

IPC - A61L 2/04; A61L 2/24; A61L 2/04; A61L 2/24 (2021.01)

CPC - A61L 2/04; A61L 2/24

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)

See Search History document

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

See Search History document

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

See Search History document

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 10,613,030 B2 (LLAMIDO) 7 April 2020 (07.04.2020) - entire document especially col 2 and 5	1-7
<u>Y</u>		8-28
Y	US 2009/0195385 A1 (HUANG ET AL.) 6 August 2009 (06.08.2009) - entire document especially para [0037], [0038], [0045], and [0060]	15-28
Y	CA 2335118 C (FERNIE) 23 December 1999 (23.12.1999) - entire document especially pg 4, 7, 8, and 9	8-14
A	US 2011/0234598 A1 (SCAROLA ET AL.) 29 September 2011 (29.09.2011) - entire document	1-28
A	US 2012/0212344 A1 (FORSBERG ET AL.) 23 August 2012 (23.08.2012) - entire document	1-28
A	US 2011/0273298 A1 (SNODGRASS ET AL.) 10 November 2011 (10.11.2011) - entire document	1-28



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"D" document cited by the applicant in the international application

"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

30 September 2021

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 21/43049

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 Extra 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.:

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 21/43049

Continuation of Box No. III Observations where unity of invention is lacking

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. In order for all inventions to be searched, the appropriate additional search fees must be paid.

Group I: Claims 1-7 are directed towards a method of effectively washing hands comprising:

applying a reactive cleansing agent to the hands, said reactive cleansing agent including a sanitizing component and a visualization component; activating the reactive cleansing agent to change an optical property of the reactive cleansing agent to increase the visibility of the reactive cleansing agent, making coverage verification easier to see.

Group II: Claims 8-14 are directed towards a handwashing apparatus comprising: a housing; a water line having an open end and a connected end, the connected end being connectable to a water supply, the open distal end terminating at a user end of the housing to provide water to a user; a sanitizer line having a distal end and a proximal end, the proximal end connectable to a sanitizer reservoir and the distal end terminating adjacent the open end of the water line; sanitizing solution contained within the sanitizer line, the sanitizing solution including a visualization component and a base component, the visualization component providing visual feedback to a user under a predetermined lighting environment. a pump in operable association with the sanitizer reservoir; a controller; a sensor mounted on the housing and capable of sending a signal to the controller when a user's hand comes within an operable proximity of the sensor; a user interface that communicates instructions to a user during a handwashing sequence.

Group III: Claims 15-22 are directed towards a method of washing hands comprising: providing a handwashing apparatus including a sequence and a user interface; providing an activation mechanism for activating the handwashing sequence; providing instruction via the user interface to keep the hands in engagement with the handwashing apparatus until at least a sanitizing solution is dispensed; changing an optical property of the sanitizing solution by activating an energy source onto the sanitizing solution present on the hands; instructing the user to ensure that all surfaces of the hands are covered with the sanitizing solution; dispensing water when a predetermined criteria is met thereby allowing the user to rinse the surfaces of the hands.

Group IV: Claims 23-28 are directed towards a handwashing apparatus comprising: a dispensing apparatus that uses a sensor to determine the presence of a user's hands; a supply of water dispensable by the handwashing apparatus; a supply of sanitizing solution; a controller associated with the handwashing apparatus that executes the handwashing sequence upon receiving a signal from the sensor or start button; wherein the sequence includes: a sanitizing solution dispensing step; a handwashing assistance step; and, a rinsing step; wherein the handwashing assistance step includes providing visualization assistance to the user that helps the user determine thorough coverage of the hands with the sanitizing solution; wherein the rinsing step is not activated until a criteria has been met.

The inventions listed as Groups I-IV do not relate to a single general inventive concept under PCT Rule 13.1 because, under PT Rule 13.2, they lack the same or corresponding special technical features for the following reasons:

Special Technical Features:

Group I requires a method of washing hands comprising of applying a reactive cleansing agent to the hands, said reactive cleansing agent including a sanitizing component and a visualization component; not required by Group III.

Group I requires a method of washing hands comprising applying a reactive cleansing agent to the hands, said reactive cleansing agent including a sanitizing component and a visualization component; and activating the reactive cleansing agent to change an optical property of the reactive cleansing agent to increase the visibility of the reactive cleansing agent, making coverage verification easier to see; not required by Group IV.

Group II requires an apparatus comprising a housing; a water line having an open end and a connected end, the connected end being connectable to a water supply, the open distal end terminating at a user end of the housing to provide water to a user; a sanitizer line having a distal end and a proximal end, the proximal end connectable to a sanitizer reservoir and the distal end terminating adjacent the open end of the water line; a pump in operable association with the sanitizer reservoir; and the visualization component providing visual feedback to a user under a predetermined lighting environment; not required by Group I, III, or IV.

Group III requires a method of washing hands comprising a handwashing apparatus including a sequence and a user interface; providing an activation mechanism for activating the handwashing sequence; providing instruction via the user interface to keep the hands in engagement with the handwashing apparatus until at least a sanitizing solution is dispensed; instructing the user to ensure that all surfaces of the hands are covered with the sanitizing solution; and dispensing water when a predetermined criteria is met thereby allowing the user to rinse the surfaces of the hands; not required by Group I.

Group III requires method of washing hands comprising a user interface and changing an optical property of the sanitizing solution by activating an energy source onto the sanitizing solution present on the hands, not required by Group IV.

Group IV requires a handwashing apparatus comprising sequence that includes a sanitizing solution dispensing step; a handwashing assistance step, and a rinsing step; wherein the handwashing assistance step includes providing visualization assistance to the user that helps the user determine thorough coverage of the hands with the sanitizing solution; and wherein the rinsing step is not activated until a criteria has been met; not required by Group II.

Group IV requires a handwashing apparatus comprising wherein the handwashing assistance step includes providing visualization assistance to the user that helps the user determine thorough coverage of the hands with the sanitizing solution, not required by Group III.

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Continuation of Box No. III Observations where unity of invention is lacking

Shared Technical Features:

Groups I-II share the common technical features of washing hands and reactive cleansing agent or sanitizing solution including a sanitizing component or base component and a visualization component. However, these shared technical features do not represent a contribution over prior art, because the shared technical feature is anticipated by US 2012/0212344 A1 to Forsberg (hereinafter "Forsberg"). Forsberg teaches washing hands (para [0019], the term "wash hands" or "hand-washing" is used for all acts involving cleansing of hands, including handwashing involving water and soap, but also disinfection actions involving alcohols or alcogels, and combinations of the before mentioned) and a sanitizing solution or reactive cleansing agent (para [0019], the term "wash hands" or "hand-washing" is used for all acts involving cleansing of hands, including handwashing involving water and soap, but also disinfection actions involving alcohols or alcogels, and combinations of the before mentioned. Alcohols or alcogels for disinfection are examples of sanitizers; see instant specification para [0004], alcohol-based sanitizers have become popular due to their ease of use and effectiveness) including a sanitizing component or base component (para [0019], the term "wash hands" or "hand-washing" is used for all acts involving cleansing of hands, including handwashing involving water and soap, but also disinfection actions involving alcohols or alcogels, and combinations of the before mentioned. Soap is the base component. Alcohols or alcogels are the sanitizing components) and a visualization component (para [0062], the cleansing agent dispenser may contain a fluorescent soap and the system comprises a means for detecting fluorescence radiation in order for the person washing his/her hands to confirm the degree of cleanness of the washed hands. In case the hands are still fluorescent, the person is triggered to wash his/her hands once more. Fluorescence is the visualization component; see instant specification para [0028], the visualization components of the sanitizing solution comprise fluorescent components).

Groups I-III share the common technical features of a method of washing hands and activating the reactive cleansing agent or sanitizing solution to change an optical property of the reactive cleansing agent or sanitizing solution. However, these shared technical features do not represent a contribution over prior art, because the shared technical feature is anticipated by US 2012/0212344 A1 to Forsberg et al. (hereinafter "Forsberg"). Forsberg teaches a method of washing hands (para [0019], the term "wash hands" or "hand-washing" is used for all acts involving cleansing of hands, including handwashing involving water and soap, but also disinfection actions involving alcohols or alcogels, and combinations of the before mentioned) and activating the reactive cleansing agent or sanitizing solution to change an optical property of the reactive cleansing agent or sanitizing solution (para [0062], the cleansing agent dispenser may contain a fluorescent soap and the system comprises a means for detecting fluorescence radiation in order for the person washing his/her hands to confirm the degree of cleanness of the washed hands. In case the hands are still fluorescent, the person is triggered to wash his/her hands once more. Fluorescence is the optical property; para [0023], the cleansing agent dispenser may be of the kind having an optical sensor means serving as the switching means which needs to be actuated in response to the presence of the person's hands a predetermined distance below the discharge nozzle of the cleansing agent dispenser).

Groups I-IV share the common technical features of washing hands, increasing the visibility of the reactive cleansing agent or sanitizing solution, making coverage verification easier to see or coverage of the hands and sanitizing solution more thorough. However, these shared technical features do not represent a contribution over prior art, because the shared technical feature is anticipated by US 2012/0212344 A1 to Forsberg et al. (hereinafter "Forsberg"). Forsberg teaches washing hands (para [0019], the term "wash hands" or "hand-washing" is used for all acts involving cleansing of hands, including handwashing involving water and soap, but also disinfection actions involving alcohols or alcogels, and combinations of the before mentioned), increasing the visibility of the reactive cleansing agent or sanitizing solution (para [0062], the cleansing agent dispenser may contain a fluorescent soap and the system comprises a means for detecting fluorescence radiation in order for the person washing his/her hands to confirm the degree of cleanness of the washed hands. In case the hands are still fluorescent, the person is triggered to wash his/her hands once more), making coverage verification easier to see or coverage of the hands and sanitizing solution more thorough (para [0062], the cleansing agent dispenser may contain a fluorescent soap and the system comprises a means for detecting fluorescence radiation in order for the person washing his/her hands to confirm the degree of cleanness of the washed hands. In case the hands are still fluorescent, the person is triggered to wash his/her hands once more).

Groups II-III share the common technical features of a handwashing apparatus comprising a user interface that communicates instructions to a user. However, these shared technical features do not represent a contribution over prior art, because the shared technical feature is anticipated by US 2011/0234598 A1 to Scarola et al. (hereinafter "Scarola"). Scarola teaches a handwashing apparatus (fig 1; para [0014], fig 1 illustrates an embodiment of a system to manage hand hygiene; para [0015], the embodiment of the dispenser causes the release or dispense of a dose of a sanitizer (e.g. such as cleaning hands)) comprising a user interface that communicates instructions to a user (para [0023], the controller can include one or more processors in communication with a memory. An embodiment of the memory can include one or more or combinations thereof of the following: or other medium operable to store programmable instructions or data retrieval; para [0025], an embodiment of the output device can be a monitor or other graphic display screen, touch-screen, LEDs, audible alert, or combinations thereof. All are such examples of user interfaces).

Groups II-IV share the common technical features of a handwashing apparatus comprising a sensor used to determine the presence of a user's hands, a controller, a water supply, and a sanitizing solution. However, these shared technical features do not represent a contribution over prior art, because the shared technical feature is anticipated by US 2011/0273298 A1 to Snodgrass et al. (hereinafter "Snodgrass"). Snodgrass teaches a handwashing apparatus (abstract, method and apparatus for monitoring and reporting hand washing at a sanitizing station employs a sensor for signaling the dispensation of a sanitizing agent from a dispenser and setting a clear signal to permit passage through a portal) comprising a sensor used to determine the presence of a user's hands (abstract, the person activates the sanitizer to dispense the sanitizer liquid or foam and that action signals that the cleaning agent has been dispensed and turns on the entrance permitted light; para [0032], the fluid-ejection nozzle is positioned to dispense fluid from the sanitizer reservoir when the dispenser is activated), a controller (para [0033], a controller receives the signal from dispensing sensor via the signal device), a water supply (para [0006], a multitude of transmitters, receivers, detectors, and a computer ensure that various activities relating to hand washing, such as dispensing water, do actually occur. "Dispensing water" implies that that the water is being dispensed from a water supply), a sanitizing solution (abstract, the person activates the sanitizer to dispense the sanitizer liquid or foam and that action signals that the cleaning agent has been dispensed and turns on the entrance permitted light; para [0032], the fluid-ejection nozzle is positioned to dispense fluid from the sanitizer reservoir when the dispenser is activated).

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 21/43049

Continuation of Box No. III Observations where unity of invention is lacking

Groups III-IV share the common technical features of a handwashing apparatus including a sequence that includes a sanitizing solution dispensing step, a handwashing assistance step, a rinsing step that dispenses water once criteria is met, an activation mechanism for activating or executing the handwashing sequence, and that the handwashing apparatus helps the user ensure thorough coverage of the hands with the sanitizing solution. However, these shared technical features do not represent a contribution over prior art, because the shared technical feature is anticipated by US 2009/0195385 A1 to Huang et al. (hereinafter "Huang"). Huang teaches a handwashing apparatus (para [0060], the intelligent controller board of the soap dispenser will also start a timer from the moment the dispenser is triggered. The dispenser with the intelligent controller is a handwashing apparatus) including a sequence (para [0044], fig 7 illustrates the handwashing sequence; para [0045], the sequence includes sensing the presence of a person's hand, dispensing the disinfectant) that includes a sanitizing solution dispensing step (para [0045], the sequence includes sensing the presence of a person's hand, dispensing the disinfectant. Disinfectant is sanitizer), a handwashing assistance step (para [0037], the system proactively prompts a person to clean his/her hands to comply with hand hygiene guidelines; para [0060], the intelligent controller board of the soap dispenser will also start a timer from the moment the dispenser is triggered), and a rinsing step that dispenses water once criteria is met (para [0060], during the first 10 or 15 seconds period, the controller board will flash "SCRUB" on the display panel on the front of the dispenser, then it will flash "RINSE" on the display panel for the next 10 or 15 seconds period; the proper handwashing steps i.e. at least 10 seconds of scrubbing with soap and 10 second of rinsing with water. Criteria can be a timer; see instant claims, claim 24, wherein the criteria is a timer).

As the shared technical features were known in the art at the time of the invention, they cannot be considered special technical features that would otherwise unify the groups. Therefore, Groups I-IV lack unity under PCT Rule 13.