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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))*

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12 September 2014

(54) Title: WATER SAVING DEVICE

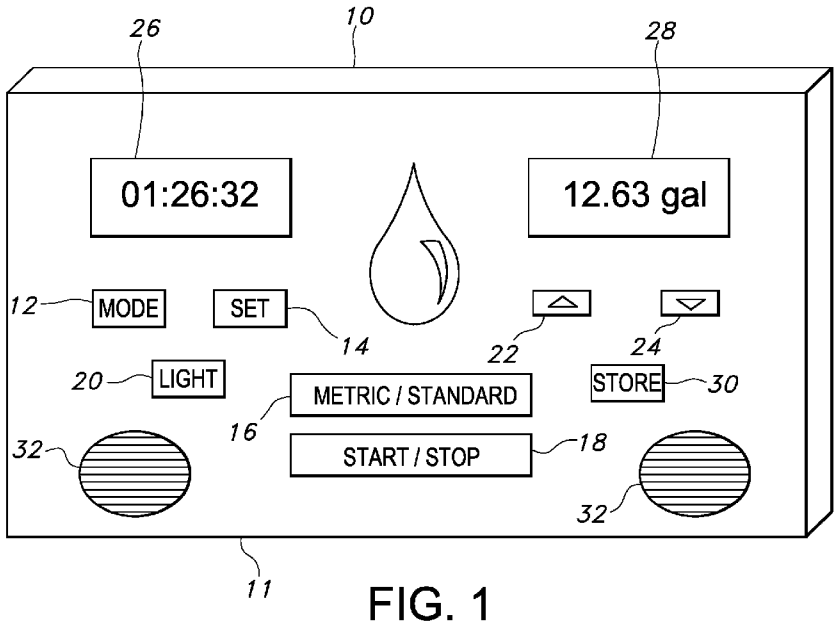

FIG. 1

(57) Abstract: A water saving device including a housing and a processor disposed within the housing. The processor calculates a water volume expended over a period of time based on a predetermined volumetric flow rate and time. A sensor is disposed within the housing for sensing the presence of a user. The sensor is operably connected to the processor. The sensor generates a signal to cause the processor to begin calculating the water volume upon sensing the presence of a user. A display indicates the expended water volume and is operatively connected to the processor. The display shows a virtual water level which rises as time and water usage increases.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US14/11685

A. CLASSIFICATION OF SUBJECT MATTER
IPC(8) - G01F1/00, 3/00; G01P 5/00 (2014.01)
USPC - 73/273; 702/45, 100
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): E03C 1/01; G01F 1/00, 3/00; G01P 1/07, 3/36, 5/00 (2014.01)
USPC: 73/273; 702/45, 100; 236/12.1, 12.12; 239/71

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

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
MicroPatent (US-G, US-A, EP-A, EP-B, WO, JP-bib, DE-C,B, DE-A, DE-T, DE-U, GB-A, FR-A); Google Scholar; ProQuest; IP.com; conserving, water, sensor, detector, processor, CPU, display, indicate, housing, infra-red

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 2008/0262755 A1 (DAYTON, DC et al.) 23 October 2008; figures 1a,1b, 2; paragraphs [0005], [0017], [0020]-[0025], [0030]-[0031]	1, 6-8 -- 2-5
Y	US 2011/0031331 A1 (KLICPERA, M) 10 February 2011; paragraphs [0036]-[0037], [0104]	2, 4
Y	US 2003/0010721 A1 (ALDRER, J et al.) 16 January 2003; paragraphs [0089], [0143]	3
Y	US 2011/0295435 A1 (LIN, J) 01 December 2011; paragraphs [0074]-[0078]	5

☐ 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	Date of mailing of the international search report
26 March 2014 (26.03.2014)	11 JUL 2014
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. 571-273-3201	Authorized officer: Shane Thomas PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774

Form PCT/ISA/210 (second sheet) (July 2009)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US14/11685

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:

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 examined, the appropriate additional examination fees must be paid.

Group I: Claims 1-8 are directed toward a water saving device with a virtual water level.

Group II: Claims 9-18 are directed toward another water saving device an infra-red sensor.

Group III: Claims 19-22 are directed toward a method of saving water utilizing a predetermined maximum water usage amount.

-***-Continued Within the Next Supplemental Box-***-

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.:
1-8

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.
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-***-Continued from Box No. III: Observations where unity of invention is lacking-***-

The inventions listed as Groups I-III 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: the special technical features of Group I include a display screen for indicating the expended water volume and being operatively connected to the processor, the display screen showing a virtual water level which rises as time and water usage increases, which are not present in Groups II-III; the special technical features of Group II include an infra-red sensor disposed within the housing, which are not present in Groups I and III; the special technical features of Group III include the processor storing a predetermined maximum water usage amount; starting the timer at the onset of water usage; the display indicating the amount of water used in relation to the predetermined maximum water usage amount, which are not present in Groups I-II.

The common technical features of Groups I-III are a water saving device comprising: a housing; a processor disposed within the housing, the processor calculating a water volume expended over a period of time based on a predetermined volumetric flow rate and time; a sensor disposed on the housing and being operably connected to the processor, the sensor generating a signal to cause the processor to begin calculating the water volume upon sensing the presence of a user; and display screen/indicator indicating the expended water volume and being operatively connected to the processor.

These common technical features are disclosed by US 2011/0031331 A1 (KLICPERA). Klicpera discloses a water saving device (an adjustable shower or bath head or water supply piping monitors water usage to encourage water savings and promote careful conscientious use of water and energy resources; paragraph [0013]) comprising: a housing (apparatus 10 includes housing 20; figure 1; paragraph [0029]); a processor disposed within the housing (housing section 20 containing the power source and a computer apparatus; figure 1; paragraph [0029]), the processor calculating a water volume expended over a period of time (CPU or microprocessor can calculate various parameters, such as, but not limited to, the duration of water supply, total number of gallons or liters of water used and flow rates; paragraph [0103]) based on a predetermined volumetric flow rate and time (set alarm conditions, e.g. temperature over-set point, time past-set point, flow rate-set points, or to program certain settings, e.g. total shower time before shutdown or alarm; paragraph [0040]); a sensor disposed on the housing and being operably connected to the processor (parameter sensors that are projecting into the water stream and electrical connection means from the sensors can be engaged to the computer/display mechanism in the display housing 20; paragraph [0031]), the sensor generating a signal to cause the processor to begin calculating the water volume upon sensing the presence of a user (motion as well as audio or verbal detection are present to turn on and off the water flow; paragraph [0142]) and display screen/indicator indicating the expended water volume and being operatively connected to the processor (when a sensor is monitoring or measuring the rate of water flowing from a water source or through the shower head, the display means could show the total volume of water that has been used; paragraph [0038]).

Since the common technical features are previously disclosed by Klicpera, these common features are not special and so Groups I-III lack unity.