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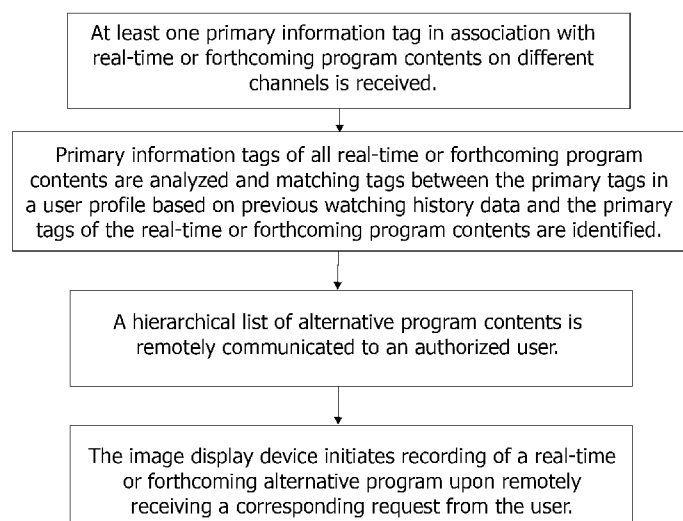
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(54) **Title:** IMAGE DISPLAY DEVICE CAPABLE OF AUTOMATICALLY SCANNING ALTERNATIVE PROGRAM CONTENTS WITH REMOTE RECORDING FUNCTION

Fig. 1



(57) **Abstract:** The present invention proposes an image display device receiving a plurality of broadcasting services and comprising a control unit effecting operation of the image display device. The control unit is configured to receive at least one primary information tag in association with real-time or forthcoming program contents on different channels, the primary information tag being directly obtainable from a broadcasting service, the control unit being further configured to analyze primary information tags of all real-time or forthcoming program contents to automatically notify real-time or forthcoming alternative program contents in the manner to identify matching tags between the primary tags in a user profile based on previous watching history data and the primary tags of the real-time or forthcoming program contents. The control unit is configured to generate a hierarchical list of alternative program contents to be remotely communicated to the user and to initiate re-recording of a real-time or forthcoming alternative program upon remotely receiving a corresponding request from the user.

Description**IMAGE DISPLAY DEVICE CAPABLE OF AUTOMATICALLY SCANNING
ALTERNATIVE PROGRAM CONTENTS WITH REMOTE RECORDING
FUNCTION**

- [0001] The present invention relates to an image display device having an automatic broadcast program offering function such that the users are automatically offered a certain number of alternative programs, the image display device being capable of remotely communicating with the user to record such broadcast programs
- [0002] Digital and interactive TV systems provide a significant amount of TV channels and programs leading to the general outcome that conventional methods for reaching a program content corresponding to the personal viewing preferences of a user from among a plurality of alternatives may become inefficient to the extent it is unperformable in a time-saving manner. Assuming that a TV service may have hundreds of channels, channel surfing might take one hour before every single channel is glanced at least once. It is to be noted that a plurality of channels from different countries may be broadcasted in a multitude of categories and an electronic program guide although proving in this respect more efficient, still involves the evident disadvantage of processing time inefficiency for a user in order for examining all the electronic program guide pages.
- [0003] Accordingly, individual viewing preferences of users can be better processed and more relevant program content can be instantaneously offered to the user without losing the processing time spent in hunting preferable program contents.
- [0004] On the other hand, user interaction is limited in the sense that the user has to engage in direct interaction with the image display device to initiate a desired function associated with the same.
- [0005] Among others, one of the prior art disclosures in the technical field of the present invention can be referred to as WO2009145507, which relates to a method for outputting an EPG and a broadcasting receiver employing the method are disclosed. More particularly, a method for outputting an EPG and a broadcasting receiver employing the method are disclosed, in which

the EPG output from the broadcasting receiver includes RSS information to allow a user to easily identify the RSS information from the EPG.

- [0006] The present invention, on the other hand, provides a system and a method by which an image display device is operated such that users are automatically offered an alternative list of program contents in a category-specific manner upon which the user can remotely initiate a desired function such as programming recording of program contents. The present invention therefore solves the technical problem of remotely operating an image display device so as to obtain and process a hierarchical list of program content according to a parameter set by the user, therefore accelerating processing of the significant amount of information for the user.
- [0007] Therefore, user-interaction is improved in the sense that the program content being viewed serves as a direct source of information for automatically obtaining secondary or auxiliary information relevant to the context of the program content such that alternative program contents are offered and delivered to the users upon which the user can remotely record a desired program. Assuming that a TV service may have hundreds of channels, there might be many occasions where a user may be interested in watching a broadcast program relating to his interests but he is only able to use conventional methods to directly manually review presented contents on each channel.
- [0008] The present invention therefore provides a system and method by which an image display device is operable to automatically offer remotely processable alternative program contents as provided by the characterizing features defined in Claim 1 and subsequent Clams.
- [0009] Primary object of the present invention is to provide a system and method by which an image display device automatically proposes a certain number of program contents in a remotely recordable manner.
- [0010] The present invention proposes an image display device which automatically monitors the user's watching activity and offers on a real-time basis an automatic list of alternative programs. This is accomplished by way of obtaining primary information tags via the

electronic program guide. A step of verifying and obtaining the full content of the information tags directly provided by the service provider in relation with the program content is optionally performed by connecting to a third party resource such as a web resource.

- [0011] When the user views a program on a given channel, the image display device, based on the number of tags saved in the user profile matching with primary tags of currently non-viewed programs and based on the importance and relative weight coefficients of any matching tags according to earlier watching records, generates a list of alternative programs.
- [0012] When the image display device is in stand-by mode, on the other hand, a control unit analyzes primary information tags of all real-time or forthcoming program contents to automatically remotely forward the list of alternative programs and initiates recording of a real-time or forthcoming alternative program upon remotely receiving a corresponding request from the user.
- [0013] Accompanying drawings are given solely for the purpose of exemplifying a system and method by which an image display device is operable, whose advantages over prior art were outlined above and will be explained hereinafter in brief.
- [0014] The drawings are not meant to delimit the scope of protection as identified in the claims nor should they be referred to alone in an effort to interpret the scope identified in the claims without recourse to the technical disclosure in the description of the present invention.
- [0015] Fig. 1 demonstrates a general flow diagram according to which the image display device of the invention executes different tasks associated with the recordable alternative program offering function according to the present invention.
- [0016] The present invention proposes an image display device enabling a user to reach a TV program according to his personal preferences without having to manually process a significant amount of channel and program type information.
- [0017] It is known that digital broadcasting services provide information in regards to the genre of the programs being watched. The genre information may

typically define a certain number of categories characterizing the content of a program. A content identifier therefore describes the contextual category of the digital program so as to let the users obtain information as to the classification of an event or a program.

- [0018] Therefore, a plurality of programs are assigned to various program genres and the image display device stores a database of various programs categorized in the form of a plurality of program genres indicative of the contextual character of the given program and associated with a given channel.
- [0019] To this end, the image display device of the present invention is fitted with an internal memory so as to store the channel-specific and category-based information, including total watching time of each channel in a respective category. More precisely, total watching time is known for each category and a list of channels that currently broadcast a program in a preferred category is accordingly hierarchically definable.
- [0020] According to the present invention, the user's viewing experience is improved by enabling accessibility to a more or equally preferable program content as delineated below. The present invention proposes an image display device enabling a user to reach preferred program contents according to her/his personal preferences in a more practical and accurate manner. More particularly, the present invention provides that an image display device automatically retrieves information in association with the program content being actually viewed such that a program content being viewed is associated with secondary or auxiliary information tags not directly provided by the program content itself. More specifically, the present invention provides that information non-directly available in a program content being viewed is obtained to offer alternative program contents to the user.
- [0021] The invention proposes an image display device receiving a plurality of broadcasting services and comprising a control unit effecting operation of the image display device. The control unit is configured to receive at least one primary information tag in association with real-time or forthcoming program contents on different channels, the primary information tag being

directly obtainable from a broadcasting service, the control unit being further configured to analyze primary information tags of all real-time or forthcoming program contents to automatically notify real-time or forthcoming alternative program contents in the manner to identify matching tags between the primary tags in a user profile based on previous watching history data and the primary tags of the real-time or forthcoming program contents. The control unit is further configured to generate a hierarchical list of alternative program contents to be remotely communicated to the user and to initiate recording of a real-time or forthcoming alternative program upon remotely receiving a corresponding request from the user.

[0022] A significant amount of data in the form of metadata information containing a multitude of attribute names, types and parameter descriptions is receivable as primary information by way of using the electronic program guide from the broadcaster. According to the present invention, the secondary or auxiliary information tags comprise a plurality of neighboring titles having relevance to primary information directly obtainable from the broadcaster. Therefore, it is possible to generate secondary or auxiliary information tags in association with the program content being viewed by way of processing the information received from the broadcaster using the electronic program guide in a dynamic manner. A pre-loaded internal database or a remote server can be used in order for associating primary information tags with secondary information tags.

[0023] In a more specific manner, in a documentary program presenting architectural background of a city in a certain geographic region of a country, the name of the city and the genre of the program can be retrieved from the electronic program guide as the primary information and this information can be processed to obtain secondary or auxiliary information tags. For instance if Rome's architectural background is presented in a documentary program, neighboring titles such as documentary programs on other Italian cities or educational programs on Ancient Roman architecture can be defined as secondary or auxiliary information tags among many others. Such secondary or auxiliary

information tags are associated with the user's profile to automatically notify real-time or forthcoming alternative programs containing matching primary information tags corresponding to the specific interests of the user.

[0024] It is to be noted secondary information tags are generated only for the programs being watched during at least a certain time duration. Then these generated secondary information tags being added to the user profile, primary tags of alternative programs are analyzed to identify matching titles. In case a matching title is identified between the primary or secondary tags in the user profile and the primary tags of the alternative programs, the relative weight coefficient of the matching tag is calculated as explained below.

[0025] It is also to be noted that the direct or primary information obtained from the broadcaster can be enriched by web crawling. In this regard, a pre-loaded internal database or a remote server can be used. For instance if only the name of a movie's director is provided by the electronic program guide, the full list of cast members and other persons is obtained from online content providers and the then-updated primary information is processed in order for retrieving secondary or auxiliary information tags such as names of directors in the genre of the current movie or other films of the cast members.

[0026] Therefore, the present invention provides that primary as well as secondary information tags are used as an input to search for alternative program contents on a real-time basis as well as including forthcoming TV programs. In this way, an automatic program notification function is performed such that for instance if the image display device is currently being viewed, it automatically previews the channels progressively in a time-limited manner starting from a channel that has the highest priority or if the image display device is in stand-by mode, it remotely communicates the hierarchical list of channels/program contents with the highest priority to the user. To this end, the image control device can conventionally be remotely controlled by a special software such as in the case of smart TV control applications running on smartphones or other terminals, computers etc. Therefore, the image display device with Internet connectivity will be

provide the hierarchical list of channels/program contents to the authorized user so that he will be able to select, if desired, any one of the real-time or forthcoming program contents to be recorded for viewing later on. The user can control the image display device through a browser interface, a dedicated application or even through an e-mail client program by inputting special commands in response to an e-mail report sent by the image display device.

- [0027] A channel having the highest priority is optionally determined by comparing weight of retrieved primary as well as secondary information tags based on earlier watching records of all the TV channels/programs. If preferred, the user can specify a specific program category. Alternatively, the image display device can generate a hierarchical list of all of the real-time or forthcoming programs independent of their categories based on the total number and weights of matching primary and/or secondary information tags.
- [0028] For instance, when a given user selects the documentary category as the preferred category, the image display device will first determine all the channels that currently broadcast or will broadcast within a certain time duration documentary content in case categorical limitation is applicable; the channel having the highest priority is defined based on the total number of primary and/or secondary information tags matching the analyzed alternative programs' primary tags. The relative weight coefficients of different tags are also taken into account. All the channels' viewing statistics provides a relative weight coefficient for each tag and when programs are processed to obtain a priority channel list, tags are compared among themselves with regard to earlier viewing records. Each tag being already assigned a certain relative weight coefficient based on earlier watching time, the relative weight coefficient is also taken into account together with the total number of tags associated with a program content.
- [0029] If a program content is found to be associated with ten primary and/or secondary information tags, the program may still have a lower priority if another program on another channel with a smaller number of primary and

secondary information tags but with a certain tag having a high relative weight coefficient takes precedence over the first channel in the priority channel list. Total number of tags of a given program and the relative weight coefficients of the tags of the program can have equal effect in calculating the overall score of the program. As an example a first program being associated with two tags such as sports and football will have a lower priority compared to another program with a single tag in case this tag happens to have a very high relative weight coefficient due to earlier watching records (for instance if it is the name of a football club supported by the user). Different hierarchical lists based on categorical limitations can be generated.

[0030] For instance if categorical limitation is applicable, as total watching time is known for each primary and/or secondary information tag, and a list of channels that currently broadcast a program in the preferred category is definable, programs can be hierarchically listed based on the number of matching primary tags (of the programs) and relative weight coefficients of each tag as explained above. An uncategorical list can also be preferential. Alternatively, channels with the highest priority with or without categorical limitation and also within a predetermined list of favorite channels can be viewable. Therefore, the best channel options that are currently airing program contents of high interest are offerable. When calculating watching durations, time durations spent in channel surfing are ignored.

[0031] If the image display device is currently viewed, it automatically previews the channels in the hierarchical lists until the user interrupts the process upon showing interest in one of the channels being previewed. If the device is in stand-by mode, the user can remotely control the image display device to effectuate recording of a certain program content. Alternatively, even if the device is turned on and the user watches TV, he may prefer to receive e-mail reports or notifications to his smartphone application so that he can control his smart TV and initiate recording sessions that capture TV programs by means of his portable terminal without interrupting the currently viewed program. Therefore a second

tuner will perform recording of the broadcast content.

- [0032] In a nutshell, the present invention proposes an image display device receiving a plurality of broadcasting services and comprising a control unit effecting operation of the image display device. In one embodiment of the present invention, the control unit is configured to receive at least one primary information tag in association with real-time or forthcoming program contents on different channels, the primary information tag being directly obtainable from a broadcasting service, the control unit being further configured to analyze primary information tags of all real-time or forthcoming program contents to automatically notify real-time or forthcoming alternative program contents in the manner to identify matching tags between the primary tags in a user profile based on previous watching history data and the primary tags of the real-time or forthcoming program contents.
- [0033] In a further embodiment of the present invention, the control unit is configured to generate a hierarchical list of alternative program contents to be remotely communicated to the user and the control unit is configured to initiate recording of a real-time or forthcoming alternative program upon remotely receiving a corresponding request from the user.
- [0034] In a further embodiment of the present invention, the control unit is further configured to generate secondary information tags in the form of neighboring titles in association with a program content by way of processing the at least one primary information tag.
- [0035] In a further embodiment of the present invention, primary information tags include at least categorical information characterizing content of a program in the form of a content identifier describing contextual category of the program.
- [0036] In a further embodiment of the present invention, secondary information tags of program contents are associated with the user's profile to automatically notify real-time or forthcoming alternative programs, such alternative program contents containing primary information tags matching primary and/or secondary information tags present in the user profile.
- [0037] In a further embodiment of the present invention, primary information tags

of alternative programs are analyzed to identify matching tags between the primary or secondary tags in the user profile and the primary tags of the alternative program contents.

- [0038] In a further embodiment of the present invention, the primary information tags directly obtainable from a broadcasting service are increased in number by way of using a pre-loaded internal database or by web crawling through a remote server.
- [0039] In a further embodiment of the present invention, pre-loaded internal database or a remote server is used in order for associating primary information tags with secondary information tags.
- [0040] In a further embodiment of the present invention, matching tags between the primary or secondary tags in the user profile and the primary tags of the alternative program contents are processed on the basis of a relative weight coefficient for each tag calculated according to previous watching history data associated with the respective tag.
- [0041] In a further embodiment of the present invention, total number and relative weight coefficients of matching tags are processed to obtain a hierarchical alternative program content list.
- [0042] In a further embodiment of the present invention, the total number of matching tags of a given program content and the relative weight coefficients of the tags have equal effect in calculating overall score of the program content in the hierarchical alternative program content list.
- [0043] In a further embodiment of the present invention, channels broadcasting program contents in the alternative program content list are automatically progressively previewed in a time-limited manner.
- [0044] In a further embodiment of the present invention, secondary information tags are generated only for the programs being watched at least during a certain time duration.
- [0045] In a further embodiment of the present invention, the image display device is remotely configured to initiate recording of a real-time or forthcoming alternative program by means of an Internet browser interface, a dedicated application or through an e-mail client program.
- [0046] In a further embodiment of the present invention, the image display device

is remotely configured to initiate recording of a real-time or forthcoming alternative program through an e-mail client program by inputting special commands in response to an e-mail report communication sent by the image display device.

[0047] Further, a method for operating an image display device is proposed.

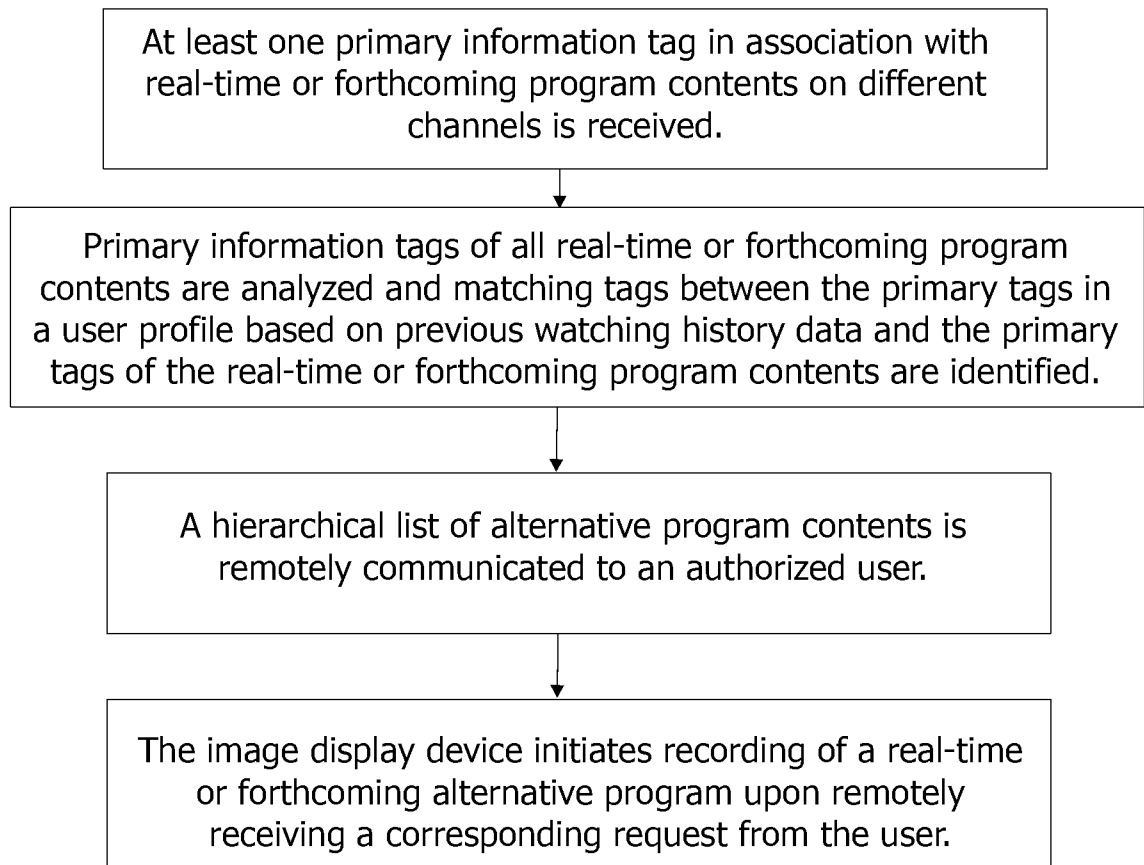
[0048] In this regard, the invention ensures that a user will not mine a significant amount of data by way of using the metadata information provided by the TV services and will instead have a chance of reviewing offered channel previews that are listed in a hierarchical manner according to his personal preferences and will be able to directly and remotely initiate recording of desired program contents in an advantageous manner. Therefore a user will reach the most relevant content automatically in the quickest way, without having to individually review a multitude of attribute names, types and parameter descriptions as in the case of an electronic program guide and remotely record desired program contents being automatically offered.

Claims

1. An image display device receiving a plurality of broadcasting services and comprising a control unit effecting operation of the image display device, **characterized in that** the control unit is configured:
 - to receive at least one primary information tag in association with real-time or forthcoming program contents on different channels, the primary information tag being directly obtainable from a broadcasting service, the control unit being further configured to analyze primary information tags of all real-time or forthcoming program contents to automatically notify real-time or forthcoming alternative program contents in the manner to identify matching tags between the primary tags in a user profile based on previous watching history data and the primary tags of the real-time or forthcoming program contents,
 - to generate a hierarchical list of alternative program contents to be remotely communicated to the user and
 - to initiate recording of a real-time or forthcoming alternative program upon remotely receiving a corresponding request from the user.
2. An image display device as in Claim 1, **characterized in that** the control unit is further configured to generate secondary information tags in the form of neighboring titles in association with a program content by way of processing the at least one primary information tag.
3. An image display device as in Claim 1 or 2, **characterized in that** primary information tags include at least categorical information characterizing content of a program in the form of a content identifier describing contextual category of the program.
4. An image display device as in Claim 2, **characterized in that** secondary information tags of program contents are associated with the user's profile to automatically notify real-time or forthcoming alternative programs, such alternative program contents containing primary information tags matching primary and/or secondary information tags present in the user profile.
5. An image display device as in Claim 4, **characterized in that** primary information tags of alternative programs are analyzed to identify matching tags between the primary or secondary tags in the user profile and the primary tags of the alternative program contents.

6. An image display device as in Claim 1, **characterized in that** the primary information tags directly obtainable from a broadcasting service are increased in number by way of using a pre-loaded internal database or by web crawling through a remote server.
7. An image display device as in Claim 2, **characterized in that** a pre-loaded internal database or a remote server is used in order for associating primary information tags with secondary information tags.
8. An image display device as in Claim 5, **characterized in that** matching tags between the primary or secondary tags in the user profile and the primary tags of the alternative program contents are processed on the basis of a relative weight coefficient for each tag, calculated according to previous watching history data associated with the respective tag.
9. An image display device as in Claim 8, **characterized in that** total number and relative weight coefficients of matching tags are processed to obtain a hierarchical alternative program content list.
10. An image display device as in Claim 9, **characterized in that** the total number of matching tags of a given program content and the relative weight coefficients of the tags have equal effect in calculating overall score of the program content in the hierarchical alternative program content list.
11. An image display device as in Claim 9, **characterized in that** channels broadcasting program contents in the alternative program content list are automatically progressively previewed in a time-limited manner.
12. An image display device as in Claim 2, **characterized in that** secondary information tags are generated only for the programs being watched at least during a certain time duration.
13. An image display device as in Claim 1, **characterized in that** the image display device is remotely configured to initiate recording of a real-time or forthcoming alternative program by means of an Internet browser interface, a dedicated application or through an e-mail client program.
14. An image display device as in Claim 13, **characterized in that** the image display device is remotely configured to initiate recording of a real-time or forthcoming alternative program through an e-mail client program by inputting special commands in response to an e-mail report communication sent by the

image display device.

Fig. 1

INTERNATIONAL SEARCH REPORT

International application No
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A. CLASSIFICATION OF SUBJECT MATTER
INV. H04N5/445 H04N21/482
ADD.

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)
H04N

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)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 8 707 357 B1 (SIE JOHN J [US] ET AL) 22 April 2014 (2014-04-22) abstract; figures 1,2,6,7 column 6, line 44 - column 6, line 51 column 7, line 3 - column 7, line 33 column 8, line 9 - column 9, line 61 column 13, line 12 - column 13, line 64 column 14, line 57 - column 15, line 7 -----	1-10, 12-14
X	US 2009/158350 A1 (DECAMP GREGORY L [US]) 18 June 2009 (2009-06-18) abstract; figure 8 paragraph [0004] paragraph [0013] - paragraph [0014] paragraph [0030] - paragraph [0033] paragraph [0056] paragraph [0075] - paragraph [0078] ----- -/-	1-14



Further documents are listed in the continuation of Box C.



See patent family annex.

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"&" document member of the same patent family

Date of the actual completion of the international search

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Name and mailing address of the ISA/

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Dolezel, Tomáš

INTERNATIONAL SEARCH REPORT

International application No

PCT/EP2015/054302

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2007/277218 A1 (BORDEN GEORGE ROME [US]) 29 November 2007 (2007-11-29) the whole document -----	1-14

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2015/054302

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 8707357	B1	22-04-2014	NONE

US 2009158350	A1	18-06-2009	US 2009158350 A1 18-06-2009
			US 2011176787 A1 21-07-2011
			WO 2009078894 A1 25-06-2009

US 2007277218	A1	29-11-2007	NONE
