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(54) Title of the Invention: **Smart mirror**
Abstract Title: **Smart mirror**

(57) A smart mirror 100 for supporting an internal circadian rhythm of a user. The mirror 100 has an interactive display unit 104 which is visible through a partially transparent reflective two-way mirror surface 102, so that the user can simultaneously view their reflection and the display. A variable light source 106 is programmable to vary its colour temperature according the circadian rhythm of the user. A controller 108 receives, via the interactive display 104, a user input circadian rhythm and modulates the colour temperature of the light accordingly. The mirror may also adjust the light colour temperature depending on the time of day. A proximity sensor 112 or ambient light level sensor 112 may be used to actuate the variable light source. The display may present information such as weather, calendar appointments, date and time etc.

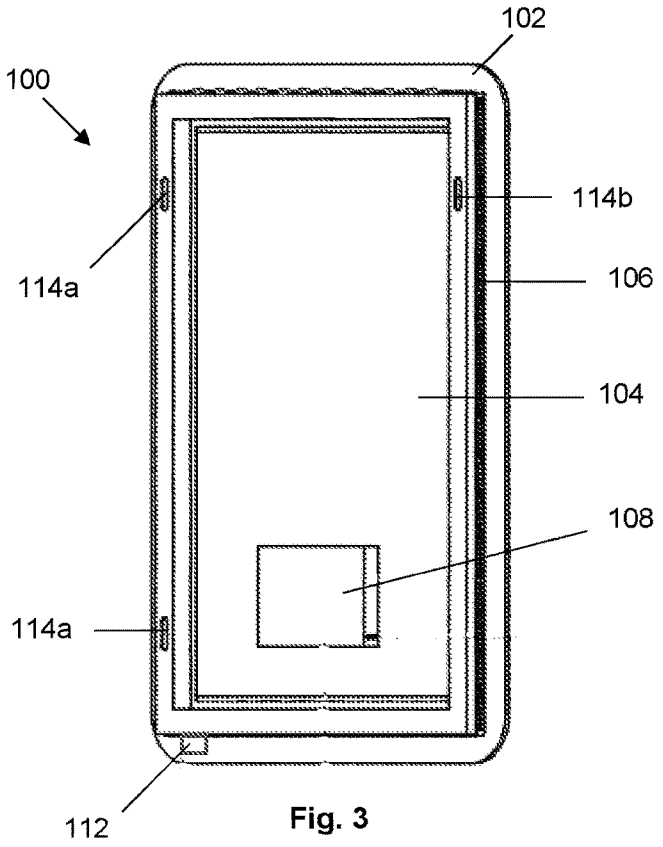

Fig. 3

GB 2598765 A

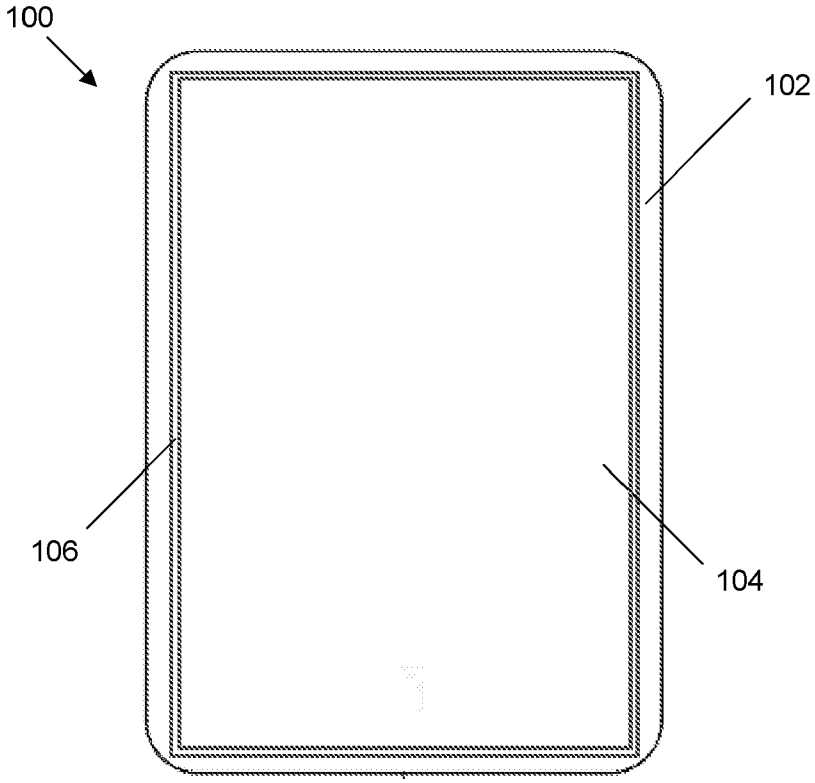

Fig. 1

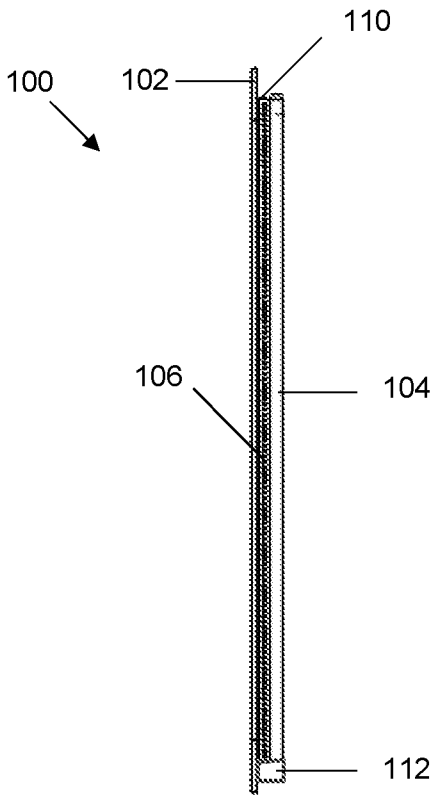

Fig. 2

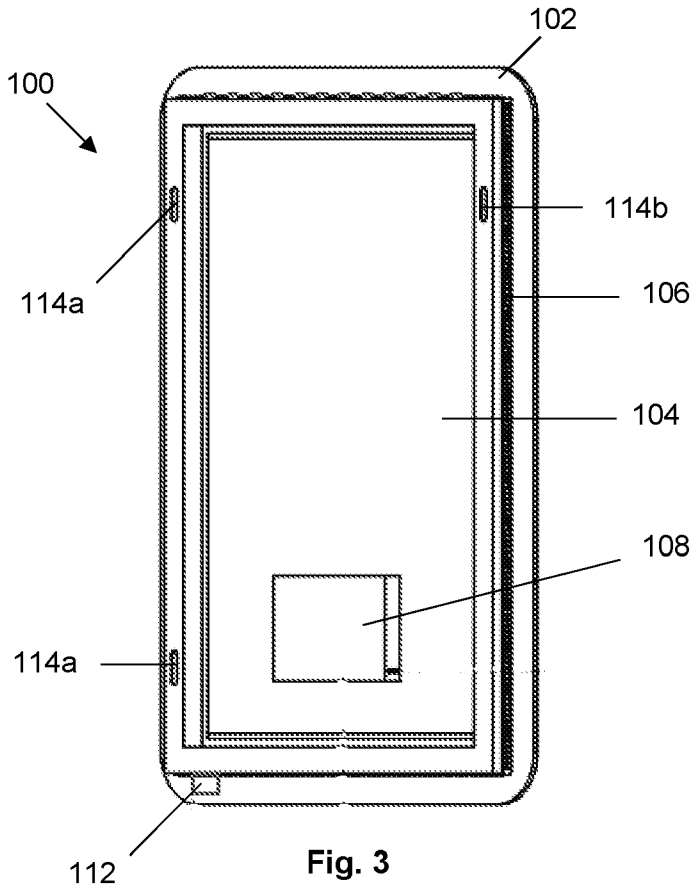
102
100
114b
114a
106
104
108
114a
112

Fig. 3

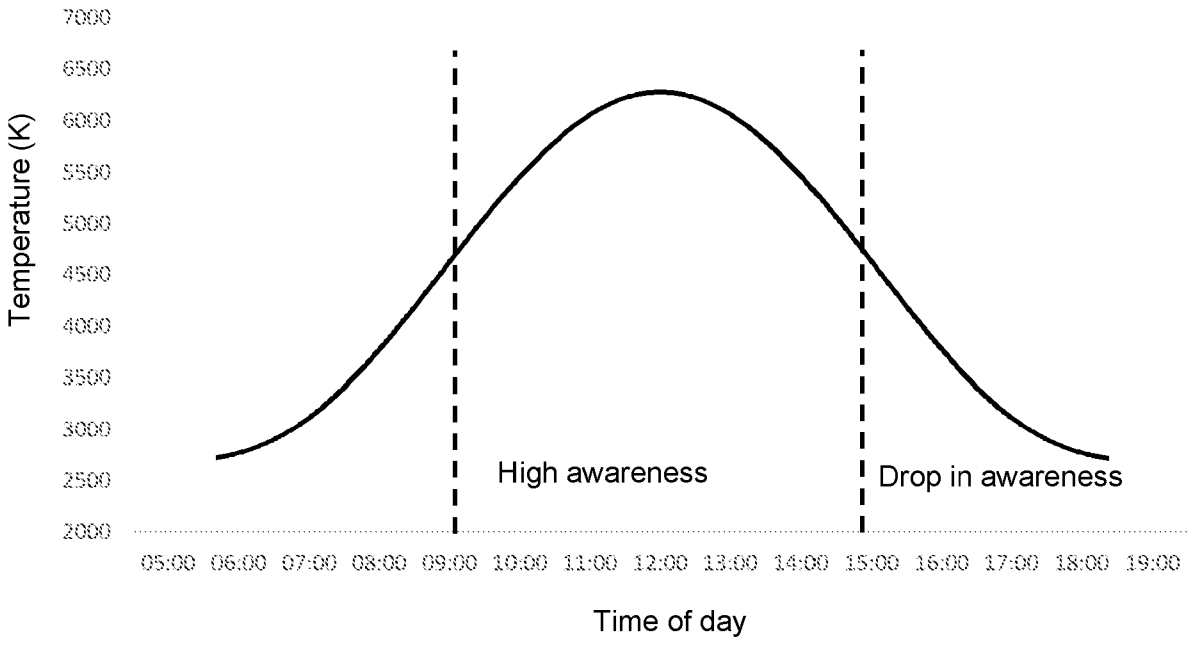
7000
6500
6000
5500
5000
4500
4000
3500
3000
2500
2000
Temperature (K)
High awareness
Drop in awareness
05:00
06:00
07:00
08:00
09:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
Time of day

Fig. 4

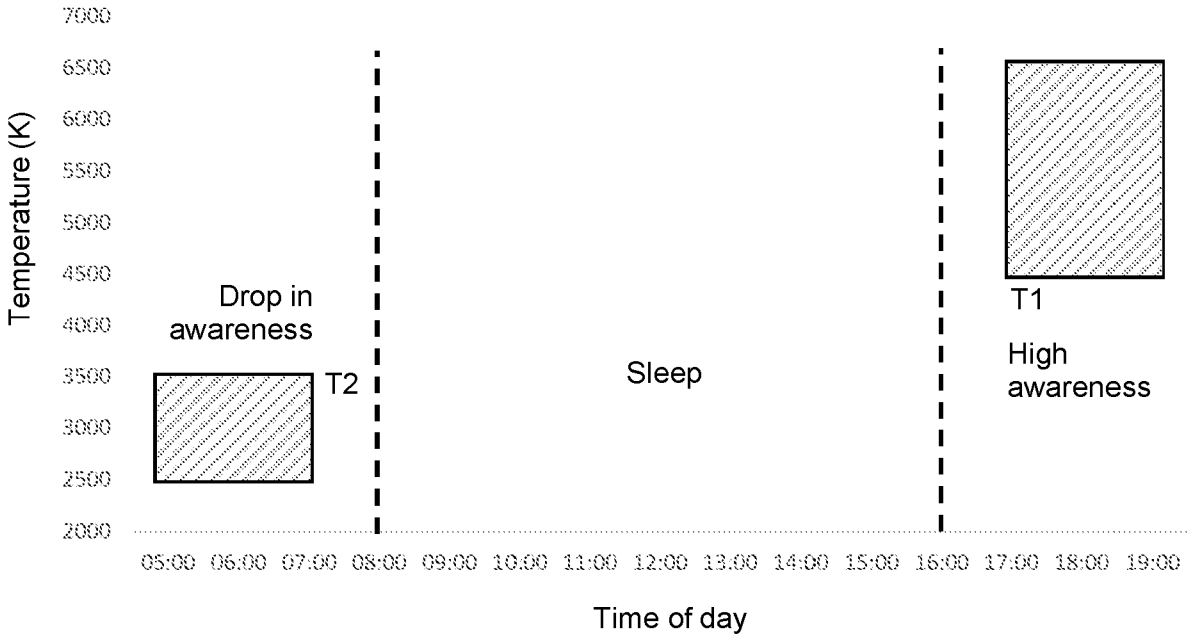
7000
6500
6000
5500
5000
4500
4000
3500
3000
2500
2000
Temperature (K)
Drop in awareness
T2
Sleep
T1
High awareness
05:00 06:00 07:00 08:00 09:00 10:00 11:00 12:00 13:00 14:00 15:00 16:00 17:00 18:00 19:00
Time of day

Fig. 5

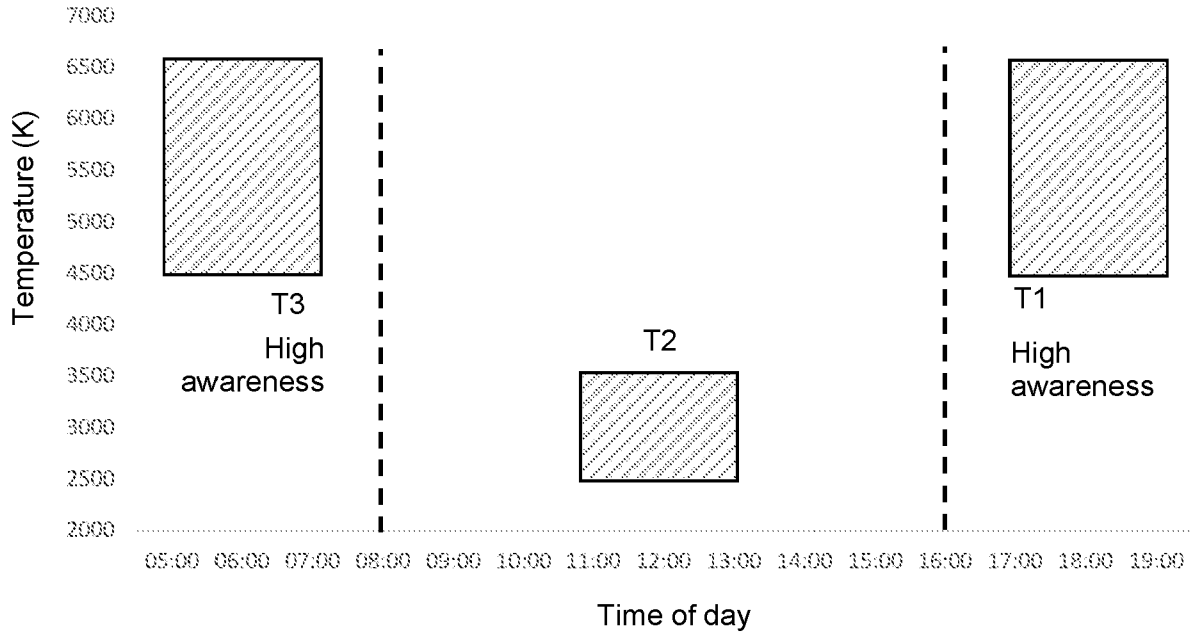
7000
6500
6000
5500
5000
4500
4000
3500
3000
2500
2000
Temperature (K)
T3
High awareness
T2
T1
High awareness
05:00 06:00 07:00 08:00 09:00 10:00 11:00 12:00 13:00 14:00 15:00 16:00 17:00 18:00 19:00
Time of day

Fig. 6

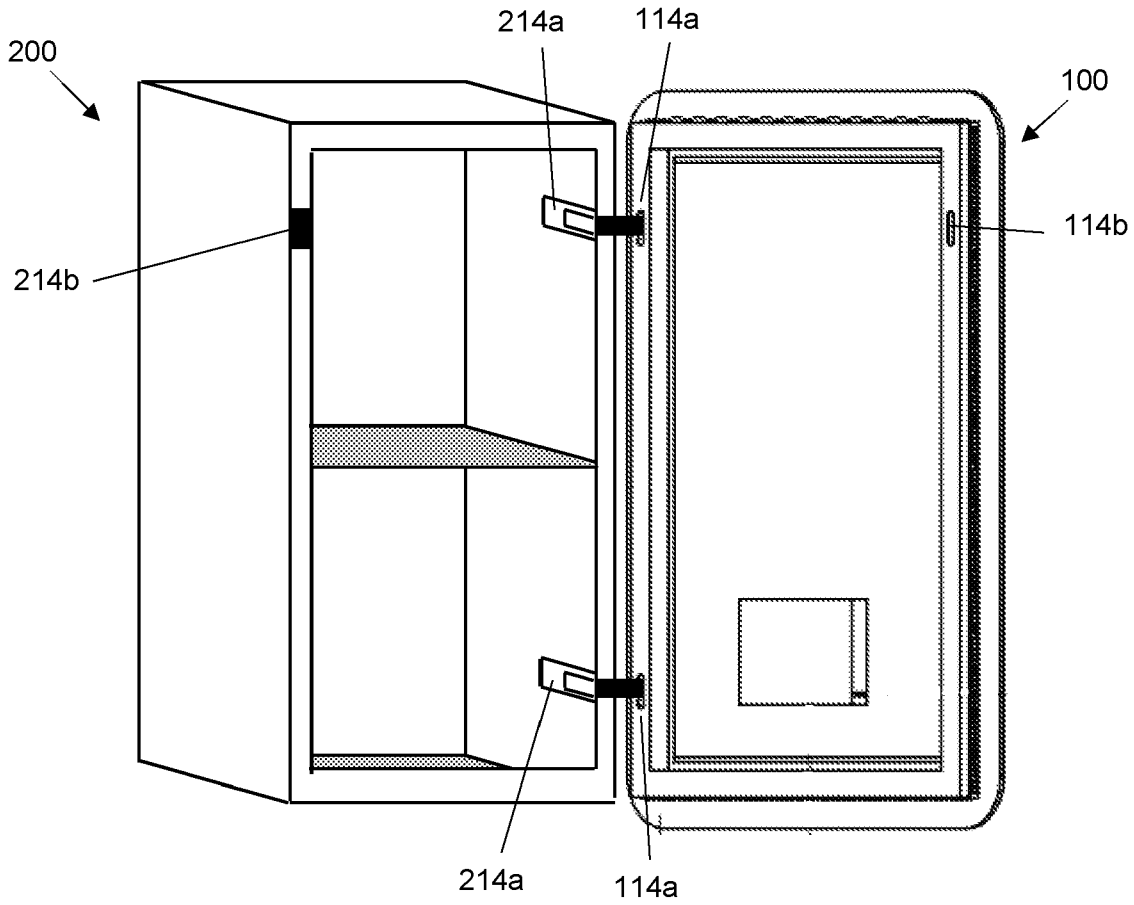

Fig. 7

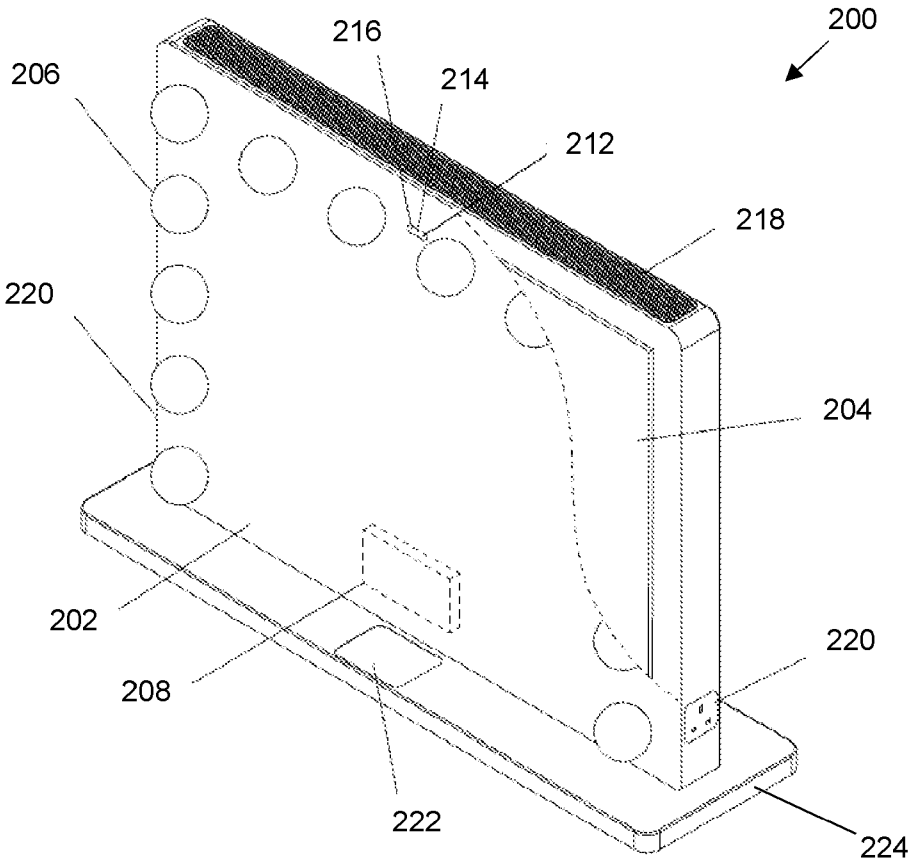
200
216
214
206
212
218
220
204
202
220
208
222
224

Fig. 8

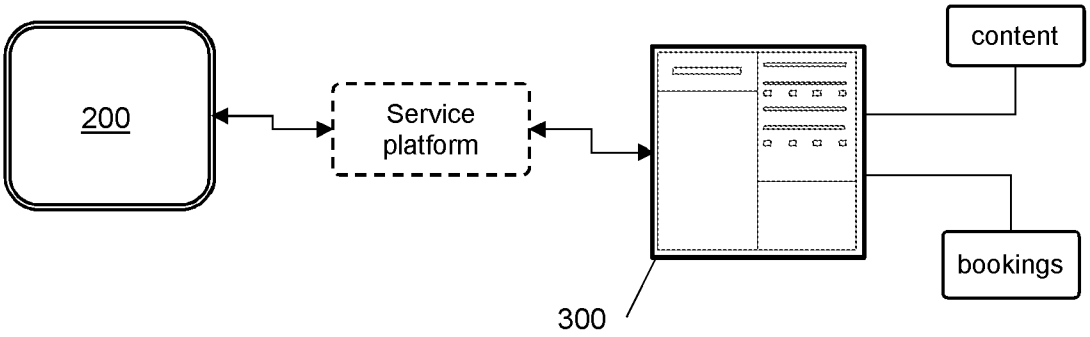
200
Service platform
content
bookings
300

Fig. 9

SMART MIRROR

[1] The present disclosure relates to mirrors. In particular the present disclosure relates to a smart mirror which supports a circadian rhythm of the user.

BACKGROUND

[2] A mirror is a well known, ubiquitous, household accessory that is almost essential for modern living. For example, a mirror placed in a bathroom is typically used to for tasks such as checking appearance, shaving, applying makeup, and brushing teeth properly. In addition, an often underappreciated aspect of mirrors is to provide an illusion of space in a room, or to provide hidden storage. For example, a mirror mounted in a kitchen can make the kitchen seem larger, as well as enhance general light levels by being a reflective surface, and may be mounted on a suitable wall or form part of a cabinet.

[3] Depending on intended usage, it can often be appropriate to provide a mirror with integral lighting. In doing so a user of the mirror may be better illuminated compared to relying on illumination from a wall or ceiling light source (which will often be behind the user relative to the mirror, thereby causing glare, or not able to provide adequate illumination). Such illumination however may often go underutilised because, for example, the lights are too bright or harsh and not easily changed, as well as being inappropriate for use in certain environments.

[4] More recently it has become known to provide a mirror with inbuilt displays to display information such as current weather conditions. Such display information however is set in advance, with a single purpose, such that if the information is irrelevant to the user then they gain no benefit from the inbuilt display of the mirror.

[5] Due to the ubiquitous presence of mirrors in households in combination with the onward march of technology, it is highly desirable to provide a mirror which actively benefits a user's lifestyle.

SUMMARY

[6] The example embodiments have been provided with a view to addressing at least some of the problems that are encountered with current mirrors, whether those

difficulties have been specifically mentioned above or will otherwise be appreciated from the discussion herein.

[7] The present invention is defined according to the independent claims. Additional features will be appreciated from the dependent claims and the description herein. Any embodiments which are described but which do not fall within the scope of the claims are to be interpreted merely as examples useful for a better understanding of the invention.

[8] In one aspect of the invention there is provided a smart mirror comprising an interactive display unit configured to output a display image responsive to a user input, a partially transparent reflective surface through which the display image is visible, a variable light source, and a controller configured to receive, via the interactive display unit, a user input defining a circadian rhythm of a user of the smart mirror, and control a colour temperature of light emission from the variable light source according to the user-defined circadian rhythm. Suitably the smart mirror is configurable to vary an output from the variable light source according to user-defined needs.

[9] In another aspect of the invention there is provided a cabinet comprising the aforementioned smart mirror. Suitably the smart mirror may be provided as an upgrade to existing cabinets, such as a kitchen cabinet.

[10] In another aspect of the invention, there is described a glamour mirror comprising the aforementioned smart mirror, and which may further comprise means for connecting to, and being controlled by, a remote electronic device.

BRIEF DESCRIPTION OF THE DRAWINGS

[11] The present disclosure will now be described by way of example only with reference to the following drawings, in which:

[12] Figure 1 shows a front view of an example smart mirror;

[13] Figure 2 shows a side view of an example smart mirror;

[14] Figure 3 shows a rear view of an example smart mirror;

[15] Figure 4 shows a graph of solar colour temperature;

[16] Figure 5 shows an example user-defined output of a variable light source;

[17] Figure 6 shows another example user-defined output of a variable light source;

[18] Figure 7 shows an example smart mirror forming a door for a cabinet;

[19] Figure 8 shows an example smart mirror formed as a glamour mirror;

[20] Figure 9 shows an example glamour mirror connecting to a service platform.

DETAILED DESCRIPTION

[21] The present disclosure is concerned with a smart mirror, and in particular a smart mirror operable to support the human circadian rhythm whilst providing enhanced functionality for modern living.

[22] Figures 1 to 3 show an example smart mirror 100. Figure 1 shows a front view, i.e. as the smart mirror 100 might appear to a user during normal use, Figure 2 shows a side view, and Figure 3 shows a rear view.

[23] In this example, the smart mirror 100 comprises a semi-mirrored surface 102, an interactive display unit 104, a variable light source 106, and a controller 108.

[24] The semi-mirrored surface 102 allows the user to view simultaneously their reflection in the mirror and to view a display output of the interactive display unit 104. In other words, the semi-mirrored surface 102 is both partially transparent and partially reflective, and so may alternatively be termed a partially transparent reflective surface.

[25] The interactive display unit 104 is configured to output a display image responsive to a user input. Accordingly, the user may configure the smart mirror to provide information such as email notifications, weather reports, calendar appointments, date & time, and the like. The interactive display unit 104 may be configured to retrieve relevant up to date information via the internet. Suitably, the user can pre-set a default display setting for the interactive display unit 104 and subsequently update/vary the display state of the interactive display unit 104 according to a real time input. In other words, the smart mirror 100 is adaptable to suit the needs of the user. Suitably, the semi-mirrored surface 102 does not interfere with control of the interactive display unit 104, so that a user does not, for example, have to use a side panel of the interactive display unit 104.

[26] The interactive display unit 104 may be configured to receive a user input via one or more of a touch, gesture, or voice of the user. Voice control may be provided in a suitable known manner by providing the interactive display 104 with a microphone. Gesture control may be provided in a suitable known manner by providing the

interactive display 104 with a camera. In another example gesture control may achieved through the use of a passive infra-red 'PIR' sensor. In the case of touch control, the semi-mirrored surface 102, in one configuration may be provided sufficiently thin such that it does not interfere with touch sensors on the interactive display unit; in another configuration the semi-mirrored surface 104 may have windows – i.e. voids – through which a specific area of a touch surface of the interactive display 104 is accessible.

[27] In this example the interactive display unit 104 is arranged to substantially match a shape of the semi-mirrored surface 102; i.e. the interactive display unit 104 is coterminous with the semi-mirrored surface 102. Preferably both the semi-mirrored surface and interactive display unit 104 are substantially rectangular. Further preferably a centre of the interactive display unit 104 is aligned/coincident with a centre of the semi-mirrored surface 102.

[28] The variable light source 106 provides illumination to a vicinity of the smart mirror 100. Here 'variable' means that output parameters of the light source 106 are controllable. For example, the light source 106 is configurable to provide illumination at different colour temperatures and luminosities. Put another way, properties of light emission from the variable light source 106 can be controllably adjusted.

[29] In this example, the interactive display unit 104 and variable light source 106 are mounted behind the semi-mirrored surface 102. That is, the semi-mirrored surface 102 is provided in-between the interactive display unit 104 and variable light source 106. The variable light source 106 is comprised of one or more light emitting diodes and is provided in abutment with at least a side edge of the interactive display unit 104, so as to provide illumination emanating from at least one side of the smart mirror 100. Preferably the variable light source 106 is arranged to provide illumination emanating in all directions around the smart mirror 100, such as by being provided on all side edges of the interactive display unit 104. Further preferably the one or more light emitting diodes are white light emitting diodes.

[30] Optionally, as shown in Figure 2, the smart mirror 100 may comprise a baffle 110 between the variable light source 106 and the semi-mirrored surface 102. The baffle 110 may be formed as a groove into which the variable light source 106 is set. In this way the user cannot directly see the variable light source 106 and illumination will be provided by a glow caused by reflection of the light emission from surrounding walls

and objects. Suitably the user is provided with a gentler ambient light emission analogous to ambient daylight which would normally affect their circadian rhythm.

[31] The controller 108 is configured to receive, via the interactive display unit 104, a user input defining a circadian rhythm of the user of the smart mirror. The controller 108 is configured to control the colour temperature of the variable light source 106 according to that user-defined circadian rhythm.

[32] A circadian rhythm is a roughly 24 hour internal clock in the physiological processes of an organism. In humans the circadian rhythm is generally regarded as cycling the human body between alert and rest periods. The circadian rhythm is maintained on schedule by extraneous cues such as sunlight and temperature. Generally cooler lighting, such as that of a midday sun, stimulates a period of high awareness, when one usually wants to be alert. Conversely warmer lighting, such as that of a setting sun, stimulates a drop in awareness, when one might be preparing for rest. In this way the solar cycle refreshes the human 24 hour internal clock. Figure 4 shows an example of solar colour temperature variation over a daylight period of 14 hours and the effect colour temperature has on awareness.

[33] With people spending less time outside – because for example many people work in artificially lit office buildings or, as is becoming more common nowadays, from home offices – providing lighting in support of the human circadian rhythm can enhance concentration, prevent sleeping disorders, and improve a person's general wellbeing. Such support for a person's circadian rhythm will only become more important in countries which may one day decide to remove daylight savings time, and which thereby will no longer adjust for greater daylight hours in the morning during winter months. Suitably the present disclosure provides for such support of a human circadian rhythm through an object which most everyone uses everyday – the mirror.

[34] More specifically the smart mirror is operable to receive a user-defined circadian rhythm which includes alternating light emission from the variable light source 106 between cool light emission and warm light emission at user-defined time slots. That is, rather than merely adjusting the variable light source 106 according to the normal solar cycle (Fig. 4), the smart mirror 100 is configurable to vary the output from the variable light source 106 according to user-defined needs. Put another way the user can pre-set a desired illumination for the variable light source 106 according to their own circadian rhythm.

[35] An example user-defined colour temperature variation or pattern is shown in Figure 5. Here, the user works nights shifts and so it is desirable to support their shifted circadian rhythm. Accordingly, the controller 108 controls the variable light source 106 to output a cool colour temperature T1 for when the user wakes in the evening, so as to stimulate alertness. In this way the variable light source 106 overrides the normal daylight cues (cf. Fig. 4) that would prepare a person for rest during an evening period and instead readies the user for their 'day'. Conversely the controller 108 controls the variable light source 106 to output a warm colour temperature T2 when the user prepares for sleep in the morning, so as to stimulate rest/sleep.

[36] Figure 6 shows a further example whereby the user has defined a circadian rhythm having entirely opposite illumination cues to normal daylight. Here the controller 108 controls the variable light source 106 to output cool colour temperature periods T1 & T3 at times which would normally have warm colour temperatures, and output warm colour temperature T2 at a time which would normally have a cool colour temperature. In other words, T1, T2 & T3 are opposite of the peaks and troughs shown in Figure 4.

[37] Beneficially a user's circadian rhythm can be maintained according to their own unique schedules even without normal daylight cues.

[38] Cool light colour temperature is preferably in the range of 4500K to 6500K, to match solar outputs, but could be as high as 10,000K. Warm light colour temperature is preferably in the range of 2500K to 3500K, again to match solar outputs.

[39] In between the set temperature times – T1 to T2, T1 to T3, or vice versa – the colour temperature can be set to a default value, such as an intermediate temperature of between 3500K to 4500K. Alternatively the colour temperature can be maintained at the last set temperature; e.g. in the case of Figure 5, maintained at T1 until the T2 period, and then maintained at T2 until the T1 period cycles again.

[40] The controller 108 is further configurable to override the current output of the variable light source 106 responsive to a user input. For example, during a time slot in which the variable light source 106 is outputting at temperature T2, the user can provide an input to the interactive display unit 104 to change the colour temperature to T1; that is, change the colour temperature from warm to cool. In this way the user has full control over the current output of the variable light source 106 and can provide ad-hoc stimulus to their circadian rhythm – i.e. by providing an alert stimulus when they

would normally have a rest stimulus. The controller may also be configured to control other lighting parameters, such as brightness, responsive to a user input.

[41] Referring again to Figures 1–3, the smart mirror 100 may optionally comprise a sensor component 112, and the controller 108 may be configured to control one or both of the interactive display unit 104 and variable light source 106 in response to the sensor component 112 being triggered. That is, when the sensor component 112 detects an event or situation that it is configured to detect.

[42] In one example the sensor component 112 is configured to trigger in response to a proximity of the user to the smart mirror 100; here the sensor component may suitably include a PIR sensor. In another example the sensor component 112 is configured to trigger in response to an ambient light in the vicinity of the smart mirror 100. In yet a further example the sensor component 112 may be configured to trigger in response to both proximity and ambient light level.

[43] In one example, the controller 108 is configured to turn on or off the interactive display unit 104 and/or variable light source 106 in response to the trigger. For example, where the sensor component 112 detects that a user is within proximity of the smart mirror 100, then the controller will turn on the variable light source 106 and interactive display unit 104. If the sensor component 112 detects that the user leaves the proximity of the smart mirror 100, then the controller will turn off both the variable light source 106 and interactive display unit 104.

[44] In another example, the controller 108 is configured to vary a brightness of the interactive display unit 104 and/or the variable light source 106 in response to the trigger. For example, where the sensor component 112 detects that an ambient light level is high, the brightness of the interactive display unit 104 can be increased so that the display output can be more easily viewed. Meanwhile, the brightness of the variable light source 106 can be decreased, or indeed turned off entirely, as increasing illumination of the user is not necessary.

[45] In a further example, the controller 108 may be configured to control the interactive display unit 104 and/or variable light source 106 in response to a combination of triggers. For example, the controller 108 may turn on the interactive display unit 104 based on proximity, and turn on the variable light source 106 based on a combination of proximity and low ambient light level.

[46] It will be appreciated that these sensor control schemes are merely examples and other combinations of control are possible.

[47] Optionally the controller 108 may include a clock component synchronised to the local time of day, and configured to control the variable light source 106 according to that synchronisation.

[48] Suitably the controller 108 provides a default setting for the colour temperature of the variable light source 106 based on the clock component. That is, prior to being set by a user the colour temperature of the variable light source 106 may be set to support the human the circadian rhythm according to normal daylight hours. Put another way, in the absence of a user configuration, the controller provides a colour temperature output according to Figure 4.

[49] For a user-defined circadian cycle, the controller 108 may be configured to control a brightness of the variable light source 106 according to the time of day indicated by the clock component, without overriding the user set colour temperature. In this way the luminosity of the variable light source 106 can be appropriately set based on the presumed likelihood of the ambient environment being light or dark. As such the clock component is particularly beneficial in arrangements of the smart mirror 100 without an ambient light sensor.

[50] The smart mirror 100 may comprise mounting means 114 for mounting the smart mirror 100 to a surface. Suitably a smart mirror 100 as described herein can be positioned in an environment at a location chosen by the user or as a replacement mirror for an existing cabinet. Further suitably the smart mirror 100 may provide a mirrored door for a cabinet 200, as shown in Figure 7, in which case the mounting means 114 may be realised as, for example, a combination of hinges 114a and catch 114b. Suitably these hinges 114a and catch 114b engage with corresponding hinge 214a and catch 214b elements on the cabinet 200, and may do so in a known manner.

[51] Preferably the smart mirror 100 is mounted in a location where a user will derive regular benefit from the mirror: for example, in a hallway, bathroom, bedroom, or kitchen, although this list should not be regarded as limiting.

[52] Providing the smart mirror 100 in a kitchen is envisaged as particularly beneficial, as this is an area of a dwelling in which a user spends much of their day (e.g. while cooking and eating), particularly at the start and end of a user's day when it is particularly desirable to support their circadian rhythm.

[53] Another particularly beneficial location is the bedroom, as this is an area of a dwelling which is used daily at precisely the times when it is most beneficial to support a user's circadian rhythm.

[54] A type of mirror which is often found in the bedroom is a glamour mirror (also known as a Hollywood mirror). A glamour mirror will be well-known to those in the art for being a ubiquitous household accessory for facilitating tasks such as checking appearance, brushing your hair, applying makeup, etc. To those that use them, glamour mirrors are considered essential to modern living.

[55] Figure 8 shows an example of a glamour mirror 200 which is formed as a smart mirror as substantially described above; that is, a smart glamour mirror 200 which is operable to support the human circadian rhythm. Or put another way, Figure 8 shows a glamour mirror 200 comprising the above smart mirror 100 and any combination of its features.

[56] Consistent with the above disclosure, the glamour mirror 200 comprises a semi-mirrored surface 202, an interactive display unit 204, a variable light source 206, and a controller 208. The glamour mirror 200 may also comprise a sensor 212, microphone 216, and camera 218. These elements may all function substantially as described above and so a repeat description is omitted.

[57] In addition to supporting a user's circadian rhythm, the glamour mirror 200 is particularly suited to supporting other aspects of a user's health via the interactive display unit 204.

[58] In one example, the interactive display unit 204 is configured to provide remote consultations with clinicians using appropriate voice over internet protocol 'VoIP' and similar video conferencing protocols, thereby removing the need for physical consultation between clinician and patient (i.e. the user of the mirror). To this end the glamour mirror 200 may suitably comprise one or speakers, or a speaker array, 218. It will be appreciated that the speaker array 218 may also be controlled via the interactive display 204 to output other sounds controllable by the interactive display unit 204; for example music or general background sounds such as birdsong, rain pouring, etc. Ambient calming noise is well known to support a listeners mental state, thereby improving the general health of the user. Suitably music and/or calming background noise may be stored on the glamour mirror 200 in a suitable storage or may be downloaded from a remote server.

[59] In another example the interactive display 204 may be controlled by a user to display health related information such as hair and makeup tutorials, preferably retrieved via the internet, again making use of the integral speakers 218. It will also be appreciated that useful health related information may be stored locally on a suitable storage medium housed within the glamour mirror 200.

[60] Figure 9 shows a further example whereby the glamour mirror 200 may connect via the internet to a proprietary service platform hosted on a suitable remote server 300. The service platform may allow the user to access bespoke content such as the aforementioned beauty tutorials as well as general health related content. The service platform may further provide for booking appointments between health/beauty experts and the mirror user.

[61] In another example, the controller 208 may include means for communicating with an external device via a wireless connection protocol. In the following example Bluetooth connectivity will be described, and suitably the controller 208 may comprise a Bluetooth connector (not shown). It will of course be appreciated that other protocols such as BLE, ZigBee, 2/3/4/5G, and so on, may be used instead of Bluetooth, and the controller 208 may be configured appropriately to function with those protocols.

[62] Thus in a preferred example the glamour mirror 200, via the controller 208, may connect with a Bluetooth enabled remote device. It is particularly envisaged that such a device will have its own display and have so-called 'smart' functionality, such as a smart phone.

[63] A remote smart device connected to the glamour mirror 200 via Bluetooth may be thereafter used to control the glamour mirror 200, and more specifically to control the display state of the interactive display unit 204. In one example, the remote smart device may control the interactive display unit 204 to display a health or beauty tutorial, thereby negating a need for the user to physically interact with the interactive display unit 204; thereby reducing potential for the glamour mirror 200 to be soiled or damaged. The user may instruct the interactive display unit 204 to connect to a tutorial hosted as part of the service platform, or to connect to a third party tutorial.

[64] In this example the glamour mirror 200 may also include one or more plug sockets 220, into which may be inserted inter alia a mobile phone charger, and may also include a wireless charging dock 222, such as a QI charger or similar. In this way the user experience of a user utilising a mobile phone or similar device may be

improved because power is readily available while they use their device to control the glamour mirror.

[65] Mains power may be supplied to the glamour mirror and its component parts via a base 224 on which the glamour mirror stands. It will be appreciated that the base 224 may be moveable (such the at the glamour mirror 200 is relocatable) and may also be fixed to a surface.

[66] In summary, embodiments of a smart mirror 100 has been described which provides enhanced functionality to a user and supports the user's internal circadian rhythm. Exemplary smart mirrors 100, 200 comprise a partially transparent reflective surface 102, 202 so that the user can view their reflection, an interactive display unit 104, 204 so that the user can view pertinent information, and a variable light source 106, 206 which is programmable to vary its colour temperature according the circadian rhythm of the user. Thus the smart mirror 100, 200 serves a dual role of both actively and passively benefiting a user's lifestyle. Active benefits include providing smart functions to a user in a location that allows them to multi-task – e.g. checking email while brushing their teeth. Passive benefits include refreshing their physiological processes.

[67] Although the above discussion focuses on preferred embodiments of the present invention, it will be readily appreciated that variations from the above are possible without departing from the scope of the invention.

[68] Various shapes and alignments of the semi-mirrored surface 102, 202 and interactive display unit 104, 204 may be provided. In one configuration the semi-mirrored surface 102, 202 and interactive display unit 104, 204 may be coincident, so that the interactive display unit 104, 204 shows through an entire surface of the semi-mirrored surface 102, 202. In another configuration the interactive display unit 104, 204 may not be centrally aligned with the semi-mirrored surface 102, 202, such that the interactive display unit 104, 204 is offset with respect to a centre of the semi-mirrored surface. In another configuration the smart mirror 100, 200 may comprise a fully-mirrored surface in addition to the semi-mirrored surface 102, 202. In another configuration the semi-mirrored surface 102, 202 may be a circle or an oval, with a similarly shaped interactive display unit 104, 204, or the interactive display unit 104, 204 may remain rectangular.

[69] A position and type of the variable light source 106, 206 may also be varied. In one example the variable light source 106, 206 may be positioned on a front or side

surface of the semi-mirrored surface 102, 202. In another example the variable light source 106, 206 may be mounted on a frame (not shown) surrounding the semi-mirrored surface 102, 202. Other colours of light source may be used in addition to or instead of white.

[70] In one example the controller 108, 208 is realised by an integral processor of the interactive display unit 104, 204. In another example the controller 108, 208 is implement by a third party device such as a Raspberry Pi™. In yet another example the controller 108, 208 may be realised by a combination of internal and external processing units.

[71] It will be appreciated that other examples and configurations not mentioned here will also be possible.

[72] The described exemplary embodiments are convenient to manufacture and straightforward to use. The smart mirror may be manufactured industrially. An industrial application of the example embodiments will be clear from the discussion herein.

[73] All of the features disclosed in this specification (including any accompanying claims, abstract and drawings), and/or all of the steps of any method or process so disclosed, may be combined in any combination, except combinations where at least some of such features and/or steps are mutually exclusive.

[74] Each feature disclosed in this specification (including any accompanying claims, abstract and drawings) may be replaced by alternative features serving the same, equivalent or similar purpose, unless expressly stated otherwise. Thus, unless expressly stated otherwise, each feature disclosed is one example only of a generic series of equivalent or similar features.

[75] The invention is not restricted to the details of the foregoing embodiment(s). The invention extends to any novel one, or any novel combination, of the features disclosed in this specification (including any accompanying claims, abstract and drawings), or to any novel one, or any novel combination, of the steps of any method or process so disclosed.

CLAIMS

1. A smart mirror comprising:

an interactive display unit configured to output a display image responsive to a user input;

a partially transparent reflective surface through which the display image is visible;

a variable light source; and

a controller configured to;

receive, via the interactive display unit, a user input defining a circadian rhythm of a user of the smart mirror, and

control a colour temperature of light emission from the variable light source according to the user-defined circadian rhythm.

2. The smart mirror of claim 1, wherein controlling the colour temperature of light emission from the variable light source according the user-defined circadian rhythm comprises alternating the light emission cyclically between cool light emission and warm light emission at user-defined time slots.

3. The smart mirror of claim 2, wherein cool light emission includes colour temperatures in a range of 4,500 to 10,000 Kelvin, and warm light emission includes colour temperatures in a range of 2,500 to 3,500 Kelvin.

4. The smart mirror of claim 3, wherein during times in between the user-defined time slots the controller sets the colour temperature of the light emission in a range of 3,500 to 4,500 Kelvin.

5. The smart mirror of any preceding claim, wherein the controller adjusts a current output of the variable light source responsive to a real time user input.

6. The smart mirror of any preceding claim, wherein the interactive display unit is configured to receive a user input via one or more of a touch, gesture, or voice of the user.

7. The smart mirror of any preceding claim further comprising a sensor component, and wherein the controller is further configured to control one or both of the interactive display unit and variable light source in response to the sensor component being triggered.

8. The smart mirror of claim 7, wherein the controller is configured to turn on or off the interactive display unit and/or variable light source responsive to the sensor component being triggered.

9. The smart mirror of claim 7, wherein the controller adjusts a luminosity output of the interactive display unit and/or the variable light source responsive to the sensor component trigger.

10. The smart mirror of any of claims 7 to 9, wherein the sensor component is triggered by a proximity of the user to the smart mirror.

11. The smart mirror of any of claims 7 to 9, wherein the sensor component is triggered by an ambient light level in a vicinity of the sensor component.

12. The smart mirror of any preceding claim, wherein the variable light source comprises one or more light emitting diodes.

13. The smart mirror of any preceding claim, wherein the variable light source is mounted behind the partially transparent reflective surface.

14. The smart mirror of any preceding claim, wherein the variable light source is positioned proximate to an edge of the interactive display unit.

15. The smart mirror of any preceding claim, wherein the variable light source is positioned proximate to an edge of the smart mirror.

16. The smart mirror of any preceding claim, further comprising a baffle which obscures a direct view of the variable light source by the user.

17. The smart mirror of any preceding claim, wherein a shape of the interactive display unit is substantially coterminous with a shape of the partially transparent reflective surface.

18. The smart mirror of any preceding claim, wherein the controller further comprises a clock component synchronised to local time.

19. The smart mirror of claim 18, wherein the clock component controls a colour temperature and/or a brightness of the variable light source according to a time of day indicated by the clock component.

20. The smart mirror of claim 19, wherein the colour temperature and the brightness of the variable light source are based on a combination of the time of day and the user-defined circadian rhythm.

21. The smart mirror of any preceding claim further comprising means for mounting the smart mirror to a surface.

22. A cabinet comprising the smart mirror of any preceding claim.

23. A glamour mirror formed as a smart mirror according to any of claims 1 to 21.

24. The glamour mirror of claim 23, further comprising means for communicating with a remote electronic display device.

25. The glamour mirror of claim 24, wherein the interactive display unit is controllable by the remote electronic display device.

Intellectual Property Office

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Claims searched:	1-25	**Date of search:**	16 February 2021

Patents Act 1977: Search Report under Section 17

Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular relevance
X	1-25	EP3064094 A1 (YANG et al.) See in particular: [0085]-[0088], [0137]-[0144], [0164], [0137-0140]
X	1-25	EP3544000 A1 (Yang et al.) See in particular; [0066]-[0068], [0100], [0160]-[0161], [0164], [0202]
X	1-25	WO2019/231982 A1 (PUTNAM) See in particular; [0138],[0159], [0171], [0221]
A	1-25	JP2018102546 A (TANIHATA) See in particular; [0015], [0041]-[0043]

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Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC^{X} :

Worldwide search of patent documents classified in the following areas of the IPC

A45D; A47J

The following online and other databases have been used in the preparation of this search report

WPI, EPODOC, Patent Fulltext, INTERNET

International Classification:

Subclass	Subgroup	Valid From
A47G	0001/00	01/01/2006