

IMPROVED MIRROR SYSTEM

Field of the Invention

The present invention relates to a mirror system. The mirror system is suitable, but not limited for installation in a bathroom.

5 Background Art

The following discussion of the background to the invention is intended to facilitate an understanding of the present invention only. It should be appreciated that the discussion is not an acknowledgement or admission that any of the material referred to was published, known or part of the common
10 general knowledge of the person skilled in the art in any jurisdiction as at the priority date of the invention.

Current mirrors and mirror systems installed in healthcare organizations such as hospitals and clinics are typically fixed at a certain height from the ground and the reflective surface of the mirror(s) are often parallel to the surface the
15 mirror is mounted on. This poses a problem to children and wheelchair bound or mobility-restricted individuals when they wish to use the mirror as often these individuals are not tall enough to view their reflection in the mirror.

Although there exists adjustable mirrors that allow a user to adjust the incline of the mirror relative to the surface it is mounted on, and thereby alleviate the
20 aforementioned problem to certain extent, these adjustable mirrors are often manually adjusted in use. Wheelchair bound or mobility restricted individuals will therefore not be able to fully utilize such adjustable mirrors.

There therefore exists a need for an improved mirror system to alleviate or mitigate the above mentioned problems, which is suitable for use in wet and
25 damp conditions such as in toilets/ bathrooms.

Summary of the Invention

Throughout the specification, unless the context requires otherwise, the word "comprise" or variations such as "comprises" or "comprising", will be

understood to imply the inclusion of a stated integer or group of integers but not the exclusion of any other integer or group of integers.

Furthermore, throughout the specification, unless the context requires otherwise, the word "include" or variations such as "includes" or "including",
5 will be understood to imply the inclusion of a stated integer or group of integers but not the exclusion of any other integer or group of integers.

In accordance with a first aspect of the invention there is a mirror system comprising a mirror having a first sensor operable to sense whether an individual is present and a second sensor operable to sense whether the
10 individual is at or above a predetermined height above ground; a processor to receive the sensed signals from the first sensor and second sensor as inputs and process the signals; and a drive mechanism operable to receive the processed signals as control inputs and rotate the mirror between a first and second position depending on whether the individual is present and whether
15 the individual is at or above the predetermined height above ground.

Preferably, the mirror is made of stainless steel.

Preferably, the first and second sensors are infrared sensors.
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Preferably, the default position of the mirror is at the first position in use.

Preferably, if the first sensor senses the presence of the individual and the second sensor senses that the individual is above a predetermined height, the
25 mirror is maintained at the first position.

Preferably, if the first sensor senses the presence of the individual and the second sensor is unable to sense that the individual is above the predetermined height above ground, the mirror is rotated from the first to the
30 second position.

Preferably, the first sensor is at a height of between 800 millimetres to 1300 millimetres above ground.

5 Preferably, the second sensor is positioned at a height of 1500 millimetres above ground.

Preferably, the drive mechanism is a motor.

10 In accordance with a second aspect of the invention there is a method for adjusting a mirror to cater to the presence and height of an individual above ground comprising the steps of:-

- a. receiving from a first sensor, input on whether the individual is present;
- b. receiving from a second sensor, input on whether the individual is at
15 or above a predetermined height above ground;
- c. processing via a processor, the inputs from the first and second sensor; and
- d. providing control inputs to a driving means, the driving means operable to rotate the mirror between a first and second position depending
20 on the whether the individual is present and whether the individual is at or above the predetermined height above ground.

Brief Description of the Drawings

25 The present invention will now be described, by way of example only, with reference to the accompanying drawings, in which:

Fig. 1 is a back perspective view of the mirror system in accordance with an embodiment of the invention;

Fig. 2 is a front perspective view of the mirror system depicted in Fig. 1;

Fig. 3 is the side perspective view of the mirror system depicted in Fig. 1;

30 Fig. 4 is a flow chart illustrating the operation of the mirror system;

Fig. 5 illustrates the mirror system in operation adjusting to a person detected at a height of less than a pre-determined level; and

Fig. 6 illustrates the mirror system in operation adjusting to a person detected at a height of equal or more than a pre-determined level.

- 5 Other arrangements of the invention are possible and, consequently, the accompanying drawings are not to be understood as superseding the generality of the description of the invention.

Description of Embodiments of the Invention

10 In accordance with an embodiment of the invention and as shown in Fig. 1 to 3, there comprises a mirror system 10. The mirror system 10 comprises a mirror 12 and a mount 14. The mount 14 comprises a drive mechanism 30 operable to rotate the mirror 12 between at least two positions upon the receipt of control inputs for actuating the drive mechanism 30. Drive mechanism may be a motor.

15 Mirror 12 comprises a reflective surface 22 and a frame 24. The reflective surface 22 is highly polished stainless steel. Frame 24 is typically made of softer material relative to the reflective surface 22, such as, but not limited to nylon. Frame 24 is operable to protect the mirror 12 and prevent users from being injured by the sharp edges associated with the reflective surface 22.
20 Positioned along a longitudinal axis (in particular a vertical axis) of the mirror 12 are at least two sensors (first and second sensors) 26. Sensors 26 are operable to detect:-

- (i.) an individual approaching the mirror (i.e. the presence of an individual within range of the sensor); and
25 (ii.) whether the individual is at a certain predetermined height above ground, which is the surface the individual stand on when he/she approaches the mirror;

and thereby send signals for actuating the motor 30 to rotate the mirror between the at least two positions. Preferably, sensors 26 are infra-red
30 sensors. The infra-red signals may be sent to a processor or motor driver (not shown) in the form of an integrated (IC) chip for processing and conversion to the necessary electrical signals to actuate the motor. To maintain the size

below certain form factor, the motor driver may be integrated with the motor 30.

In an example arrangement comprising two infrared sensors 26, a first sensor 26a is located at a first pre-determined position along the vertical axis of the mirror, and the second sensor 26b is located at a second predetermined position along the vertical axis of the mirror. It is to be appreciated that when the mirror 12 is mounted, the second sensor 26b is at a higher height than the first sensor 26a, relative to the ground.

Mount 14 comprises a mounting plate 32 for affixing the mirror 12 onto a suitable surface, such as the wall of a bathroom, via fastening means 34 such as but not limited to, screws, nuts, bolts etc. Such fastening means 34 are typically known to a skilled person of the art and will not be further elaborated. Motor 30 may be a stepper, alternating current (AC) or direct current (DC) motor operable to provide a synchronous rotational speed to rotate the mirror 12 between the desired positions. On the mount 14 are disposed two stoppers 36 to restrict the movement of the mirror 12 between the desired two positions. One of the stopper 36a may further comprise a magnet 38 to hold the mirror 12 at a default position. In some embodiments, both the stoppers 36 may comprise magnet 38 and the stoppers 36 may be covered with a thin layer of resin to prevent damaging the magnets.

The motor 30 may comprise damping means 40 to damp and control the rate of rotation of the mirror and avoid 'jerky' actions and to smoothen the rotational movement between the at least two positions. Such a damping means 40 may be in the form of a damping hinge 40.

The mirror system 10 will next be described in the context of its operation.

In an example arrangement, the mirror 12 is rotatable between a first position and a second position. The first position may be at a zero inclination with respect to the surface the mirror system 10 is mounted on. The second position may be a ten degrees downward inclination with respect to the surface it is mounted on. The first pre-determined position of first sensor 26a may be at a level of 800 millimetres to 1300 millimetres. The positioning of the second sensor 26b may be at a level of 1400 millimetres to 1600 millimetres, preferably around 1500 millimetres. In operation, the sensors 26 are

constantly sensing for infrared radiation emitted by an individual, such as a person.

Referring to the flow chart in Fig. 4, the mirror system 10 is maintained at a default position (i.e. no incline of the mirror 12 in respect to the mount 14 and wall surface). At this position, the stopper 36a is held or maintained in contact with the mirror 12 via magnet 38.

As an individual, for example a person of certain height approaches the mirror system 10 (step 402), at least the first sensor 26a will detect the presence of the individual.

With reference to Fig. 5, If the person's height (i.e. measured from the top of head to feet) is less than 1500 millimetres (step 404), only the first sensor 26a is able to sense the presence of the individual (step 406), and the motor 30 is operable to activate and turn in the clockwise direction until the mirror 12 contacts the stopper 36b (step 408). The mirror 12 will then be at an inclined position with respect to the mounted surface (step 410), where a person less than 1500 millimetres may view his/her reflection.

With reference to Fig. 6, if the person's height (i.e. measured from the top of head to feet) is equal or more than 1500 millimetres (step 412), then the height can be detected by both sensor 26a and 26b (step 414). In such case, the mirror is maintained at its default position (step 416).

In the case where the mirror 12 is inclined, once the individual moves away, the mirror 12 will no longer detect the presence of the individual (step 418). The motor 30 will then be activated to turn in a counter-clockwise direction until it touches stopper 36a, the default position (step 420).

It is to be appreciated that where the individual's height is between the first and second sensors 26a, 26b, for example more than 1300mm but less than 1500mm, the mirror may be operable to tilt towards the stopper 36b.

It is to be further appreciated that where sensor 26b detects the height of the individual above ground and sensor 26a does not detect the presence of the individual, the mirror 12 remains at its default position.

The above arrangement is for illustrative purpose, it is envisaged that the pre-determined positions and heights may be determined in accordance with specific purpose and usage.

5 In the described embodiment or in other embodiments, the motor 30 may rotate a mirror of 13.5 kilograms at a torque of at least 86.8kg.cm.

It should be further appreciated by the person skilled in the art that variations and combinations of features described above, not being alternatives or substitutes, may be combined to form yet further embodiments falling within the intended scope of the invention. In particular,

- 10 • Although in the described embodiments the sensors 26 are infra-red sensors, it is to be appreciated that one or more sensors 26 may be replaced with other types of sensors performing similar functions (e.g. motion sensor);
- 15 • As an alternative to stainless steel, the material used for a mirror 12 may be other reflective material as known to a skilled person (e.g. aluminium);
- Additional sensors 26 may be used in combinations with additional stoppers 36 so as to enable additional resting positions for the mirror 12.
- 20 • In some embodiments, in case of a loss of electrical power due to whatever reason(s), the mirror 12 may be manually tilted and held on to the position at 36a and 36b via one or more magnetic latches 38.
- In some embodiments, the plurality of sensors 26 may be positioned at either side of the mirror. The following configurations are possible and
25 non-exhaustive. Sensor 26a and 26b may be both on the left side or both on the right side of the mirror 12; one or either sensor 26a, 26b may be on the left side, the other of sensor 26a, 26b on the right side, etc.

CLAIMS

1. A mirror system comprising
a mirror having a first sensor operable to sense whether an individual is
present and a second sensor operable to sense whether the individual is at or
above a predetermined height above ground;
a processor to receive the sensed signals from the first sensor and second
sensor as inputs and process the signals; and
a drive mechanism operable to receive the processed signals as control
inputs and rotate the mirror between a first and second position depending on
whether the individual is present and whether the individual is at or above the
predetermined height above ground,
wherein the first sensor is located at a first pre-determined position along the
vertical axis of the mirror, and the second sensor is located at a second
predetermined position along the vertical axis of the mirror.
2. The mirror system according to claim 1, wherein the mirror is made of
stainless steel.
3. The mirror system according to claim 1 or 2, wherein the first and second
sensors are infrared sensors.
4. The mirror system according to any one of the preceding claims, wherein in
use the default position of the mirror is at its first position.
5. The mirror system according to claim 4, wherein if the first sensor senses the
presence of the individual and the second sensor senses that the individual is
above a predetermined height, the mirror is maintained at the first position.
6. The mirror system according to claim 4, wherein if the first sensor senses the
presence of the individual and the second sensor is unable to sense that the
individual is above the predetermined height above ground, the mirror is
rotated from the first to the second position.

7. The mirror system according to any one of claims 4 to 6, wherein the first sensor is at a height of between 800 millimetres to 1300 millimetres above ground.

5 8. The mirror system according to any one of claims 4 to 7, wherein the second sensor is positioned at a height of 1400 to 1600 millimetres above ground.

9. The mirror system according to any one of the preceding claims, wherein the drive mechanism is a motor.

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10. A method for adjusting a mirror to cater to the presence and height of an individual above ground comprising the steps of:-

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a. receiving from a first sensor, input on whether the individual is present;

b. receiving from a second sensor, input on whether the individual is at or above a predetermined height above ground;

c. processing via a processor, the inputs from the first and second sensor; and

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d. providing control inputs to a driving means, the driving means operable to rotate the mirror between a first and second position depending on the whether the individual is present and whether the individual is at or above the predetermined height above ground,

wherein the first sensor is located at a first pre-determined position along the vertical axis of the mirror, and the second sensor is located at a second predetermined position along the vertical axis of the mirror.

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