pulsing the vacuum motor to provide an audible indication that the vacuum cleaner is blocked. However, in known arrangements the indications provided to the user can require interpretation, the information that can be conveyed is limited, and/or the indication can go unnoticed by the user.

It is one object of the present disclosure to mitigate or obviate at least one of the above disadvantages, and/or to provide an improved or alternative handheld vacuum cleaner or stick vacuum cleaner.

According to a first aspect of the present disclosure there is provided a handheld vacuum cleaner comprising:

a pistol grip which is positioned generally transverse to a longitudinal axis of the vacuum cleaner that runs from a front end to a rear end thereof;

an air inlet positioned forward of the pistol grip;

a vacuum motor configured to draw dirty air into a dirt separator of the vacuum cleaner through the air inlet, and exhaust clean air from the vacuum cleaner through an air outlet; and

an electronic visual display which faces generally rearwards,

wherein the electronic visual display projects through or is visible through an aperture in a user-removable component.

In use, the user holds the vacuum cleaner by the pistol grip and ‘points’ the longitudinal axis towards an area to be cleaned in a manner akin to pointing a pistol at a target, so as to direct the air inlet (or a suction tool attached thereto) to that area. The electronic visual display facing generally rearwards means that it more clearly visible to the user during use. In contrast, if the electronic visual display faced in a different direction, the user may have to discontinue use and reposition the vacuum cleaner so as to view the electronic visual display.

The presence of an electronic visual display on a handheld vacuum cleaner may be somewhat counter-intuitive in that such vacuum cleaners are generally battery powered, therefore electrical power is at a premium and steps are generally taken to ensure that as much power as possible is delivered to the vacuum motor rather than peripheral systems. However, the inventors of the present application have discovered that presence of the electronic visual display can allow the remaining power to be used more efficiently (for instance by alerting the user that the vacuum cleaner is blocked so

that they do not waste power attempting to continue use), and/or offer a greater level of 'user friendliness', thereby compensating for the power used by the electronic visual display itself.

It is to be understood that an electronic visual display is distinct from a single light. Such a light has two conditions, on or off, whereas a display device is capable of displaying at least three different conditions. For instance, the display device may comprise an array of lights which can be lit in different combinations (for example a single digit seven segment display, which comprises an array of elongate lights which can be light in combinations to display the digits 0-9).

Reference to the handheld vacuum cleaner having a longitudinal axis is not intended to imply that the handheld vacuum cleaner is elongate or comprises an elongate component. Rather, the longitudinal axis of a handheld vacuum cleaner may be considered to be the direction in which the user 'points' the vacuum cleaner to direct it. Nonetheless, in some examples the handheld vacuum cleaner may comprise an elongate body the longitudinal axis of which is collinear with the longitudinal axis of the vacuum cleaner. Said elongate body may be, for example, a main body, a motor housing, a rotational axis of a dirt separation stage or an elongate duct section of the air inlet.

For the avoidance of doubt, reference to the handheld vacuum cleaner exhausting clean air is intended to mean that some dirt entrained therein has been removed by the dirt separator. It is not intended to imply that the 'clean' air has had all dirt removed therefrom.

The pistol grip is preferably positioned at an angle of more than 50 degrees, for instance more than 60 degrees or more than 70 degrees to the longitudinal axis. In some examples the pistol grip may be positioned substantially perpendicular to the longitudinal axis. However, the pistol grip is preferably positioned at an angle of less than 85 degrees or less than 80 degrees to the longitudinal axis. This may allow the position of the user's hand to be positioned more naturally, thereby making the handheld vacuum cleaner more comfortable to use for extended periods.

The electronic visual display may be positioned behind the vacuum motor.

The handheld vacuum cleaner may comprise a battery arranged to power the vacuum motor and/or the screen. The battery is preferably rechargeable. Instead or as well, the battery may be part of a user-removable battery pack.

The handheld vacuum cleaner preferably comprises a first housing positioned at one end of the pistol grip, and a second housing positioned at the other end of the pistol grip. Where the handheld vacuum cleaner comprises a battery, the first housing may contain the vacuum motor and the second housing may contain the battery. This may distribute the weight of the vacuum cleaner more evenly about the pistol grip, thereby making the handheld vacuum cleaner more manoeuvrable and/or more comfortable to use for extended periods.

Where the pistol grip extends from a lower end configured to be gripped by the little finger and/or ring finger of the user to an upper end configured to be gripped by the index finger and/or middle finger of the user, the first housing may be positioned at the upper end of the pistol grip and the second housing may be positioned at the lower end of the pistol grip.

The pistol grip may join the first and second housings to one another. The handheld vacuum cleaner may further comprise a support strut which runs between the first and second housings. The first and second housings being joined together by both the pistol grip and the support strut may improve the strength and/or rigidity of the handheld vacuum cleaner.

The dirt separator may be supported by the first housing and/or the second housing. For example, the dirt separator may be supported by or contained within the first housing.

According to a second aspect of the present disclosure there is provided a stick vacuum cleaner comprising:

a handheld vacuum cleaner as disclosed herein;

a cleaner head defining a suction opening; and

an elongate rigid wand defining a suction path which extends from the cleaner head to the air inlet of the handheld vacuum cleaner, the wand being positioned substantially parallel to or collinear with longitudinal axis.

The wand may be substantially collinear with the longitudinal axis.

The wand is preferably removably connected to the handheld vacuum cleaner and the cleaner head.

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

Figure 1 is a perspective view of a stick vacuum cleaner according to an embodiment of the present invention;

Figure 2 is a perspective view of a handheld vacuum cleaner of the stick vacuum cleaner of Figure 1;

Figure 3 is a schematic cross-sectional view through the handheld vacuum cleaner of Figure 2; and

Figure 4 is a perspective view of the handheld vacuum cleaner of Figures 2 and 3, with a removable component separated therefrom.

Throughout the description and drawings, corresponding reference numerals denote corresponding features.

Figure 1 shows a stick vacuum cleaner 2 according to an embodiment of the invention. The stick vacuum cleaner comprises a handheld vacuum cleaner 4 which is connected to a floor tool 6 in the form of a cleaner head by an elongate rigid wand 8. In this case the wand is attachable to an air inlet 10 of the handheld vacuum cleaner, and to a rear duct 12 of the cleaner head 6. The wand 8 is generally tubular, the space inside

**CLAIMS**

1 . A handheld vacuum cleaner comprising:

a pistol grip which is positioned generally transverse to a longitudinal axis of the vacuum cleaner that runs from a front end to a rear end thereof;

an air inlet positioned forward of the pistol grip;

a vacuum motor configured to draw dirty air into a dirt separator of the vacuum cleaner through the air inlet, and exhaust clean air from the vacuum cleaner through an air outlet; and

an electronic visual display which faces generally rearwards,

wherein the electronic visual display projects through or is visible through an aperture in a user-removable component.

2. A handheld vacuum cleaner according to claim 1 wherein the electronic visual display is a screen.

3. A handheld vacuum cleaner according to claim 1 or 2 wherein the electronic visual display is configured to selectively display at least two different colours.

4. A handheld vacuum cleaner according to any preceding claim wherein the electronic visual display is substantially planar, and is positioned at an angle of no more than 20 degrees to the longitudinal axis.

5. A handheld vacuum cleaner according to any preceding claim wherein the electronic visual display is positioned axially rearwards of the pistol grip.

6. A handheld vacuum cleaner according to any preceding claim wherein the pistol grip is positionable in a generally vertical orientation when the longitudinal axis is horizontal, the pistol grip extending from a lower end to an upper end, and the electronic visual display is positioned radially above the pistol grip.

7. A handheld vacuum cleaner according to any preceding claim wherein the user removable component comprises a pre-motor filter member which is positionable in a fluid path upstream of the vacuum motor.

8. A handheld vacuum cleaner according to any preceding claim wherein the user removable component comprises a post-motor filter member which is positionable in a fluid path downstream of the vacuum motor

9. A handheld vacuum cleaner according to any preceding claim further comprising a control member configured to receive a control input from a user, the control member being positioned adjacent to the electronic visual display.

10. A handheld vacuum cleaner according to claim 9 wherein the control member faces generally rearwards.

11. A handheld vacuum cleaner according to any preceding claim wherein the longitudinal axis intersects the electronic visual display.

12. A handheld vacuum cleaner according to any preceding claim wherein the dirt separator has a generally cylindrical outer wall which is substantially concentrically positioned around the longitudinal axis.

13. A handheld vacuum cleaner according to claim 12 wherein said outer wall defines a dirt collection chamber.

14. A stick vacuum cleaner comprising:

a handheld vacuum cleaner according to any one of claims 1 -13;

a cleaner head defining a suction opening; and

an elongate rigid wand defining a suction path which extends from the cleaner head to the air inlet of the handheld vacuum cleaner, the wand being positioned substantially parallel to or collinear with longitudinal axis.