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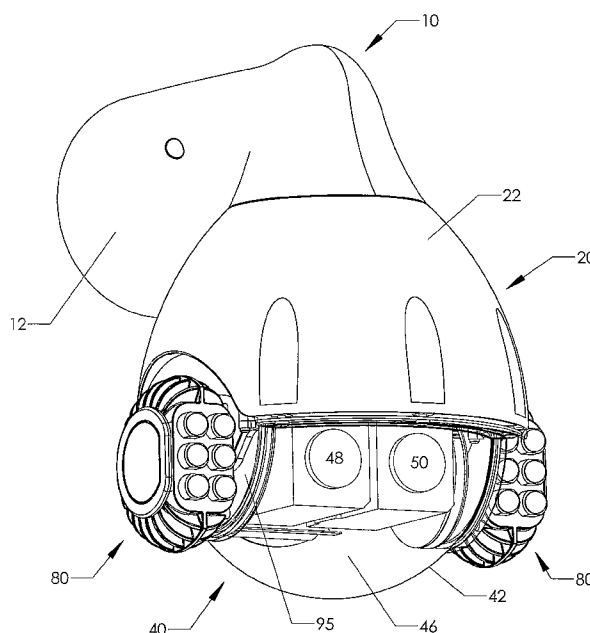
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(54) Title: SURVEILLANCE APPARATUS



(57) Abstract: The surveillance apparatus comprises a transparent dome (40) with one or two infrared video cameras (48, 50) mounted on a tilt mounting inside the dome and pulsed LED illuminators (80) on the same tilt mounting outside the dome, the dome itself being on a pan rotational mounting. The cameras may be of different focal lengths and the illuminators may be of wide or narrow beam accordingly, selectively actuated. A mask inside the transparent dome minimises light scattering.

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SURVEILLANCE APPARATUS

This invention relates to surveillance apparatus, and in particular is concerned with surveillance apparatus incorporating a video camera suitable for providing closed circuit television signals to a monitoring point where, typically, the TV images are displayed on monitor screens for viewing by human operators and recorded for short or long term archiving purposes.

For the surveillance of premises using closed circuit television, surveillance cameras are usually mounted in fixed locations, very often elevated locations on posts or buildings which give a greater field of view than low level cameras and enjoy additional security by being more difficult to access. For twilight and night time surveillance, artificial lighting may be necessary. For a number of reasons, including the avoidance of neighbourhood light pollution and possible advantages of not alerting intruders, active infrared lighting is frequently used. Active infrared, as opposed to passive infrared, implies that the scene to be observed is positively illuminated with infrared radiation from one or more sources provided for that purpose.

It is an object of the invention to provide surveillance apparatus offering improvements and advantages, in one or more respects, over apparatus currently available.

In accordance with one aspect of the invention there is provided surveillance apparatus comprising directional illumination means; a video camera; a transparent dome, mounted over the camera; a tilt mounting for the camera within the dome; a pan mounting for the camera and dome together; said directional illumination means being mounted outside the dome and locked to the alignment of the camera.

In preferred embodiments of the invention, the illumination means are operative at infrared wavelengths; the video camera may

be a video camera sensitive to said wavelengths; and the dome may be transparent to said wavelengths.

A tilt mounting for the camera would normally be understood to mean a mounting which enables the camera to swivel the optical axis of its field of view in a vertical plane, and in contrast to a tilting motion the pan mounting would normally be understood to mean a mounting which enables the optical axis of the field of view of the camera to swivel in a horizontal plane, although the term 'pan' may also be used in the art for vertical movement. It will be appreciated that surveillance apparatus which nominally provides both vertical tilt and horizontal pan motions could, in fact, be mounted so that these horizontal and vertical planes were interchanged. It should be understood that, in the context of this specification, the words tilt and pan are used to indicate two intersecting planes, nominally expected to be orthogonal to each other, and as will be seen from the specific description of the embodiment of the invention illustrated in the drawings the term pan motion is nominally applied to the horizontal and tilt nominally to the vertical tracking of the video camera, in accordance with the predominant usages of these terms in this art.

Apparatus in accordance with the invention will normally be provided with anchorage means, whereby it can be attached to a fixed structure such as a building, observation post or tower. The anchorage means may comprise a mounting bracket of any convenient form for attaching the apparatus to a surface, typically a vertical surface (wall mounting) or horizontal surface (under-canopy mounting).

The preferred orientation of the apparatus when anchored to a structure allows substantially 360° or continuous pan movement, and at least about 90°, usually between horizontal and vertical, tilt movement; but it is of course possible that in any given location some of the field of view will be obscured over these ranges by part of the structure on which the apparatus is mounted. A camera mounted in an elevated location will normally tilt so

that at least its field of view extends between horizontal and vertically downwards.

The dome, which is transparent to the wavelengths used, need not be transparent over its whole extent. Since the dome and the camera within it rotate together on the pan mounting, the dome need only be transparent in a window band which is wide enough not to encroach on the camera's lateral field of view, and extends vertically to accommodate the amount of camera tilt chosen by the designer. For practical reasons, that part of the shell of the dome which constitutes the window through which the camera is able to scan an external view is substantially spherical, with the optical axis of the camera passing through or close to the centre of that sphere as the camera tilts. In this way, the transparent shell of the dome will always be approximately perpendicular to the viewing axis of the camera, and a constant distance from it. The remainder of the dome may in principle be of any shape, as it does not interact technically with the optics of the system.

The directional illumination means are outside the dome, and are locked to the alignment of the camera. Preferably, this is achieved by arranging for the tilt mounting of the camera to pass through the dome and for the illumination means to be mounted on a portion of said tilt mounting that lies outside the dome. In a preferred embodiment of the invention, the tilt mounting includes a thermally insulating portion between the illumination means and the interior of the dome. The illumination means, generating visible or infrared radiation, will typically become hot, with external temperatures in the region of 100°C. By placing the illuminators outside the dome and providing this thermal insulation, temperatures within the dome can be kept low. This in turn enables the dome to be made smaller and less obtrusive, reduces the need for ventilation and forced air cooling internally, and generally allows improved sealing of the interior of the dome against undesired access or intrusion of any kind.

Suitable thermally insulating materials are engineering plastics of various kinds, including polyamide resins. Nylon has a thermal conductivity k of about 0.25W/m K, while the thermal conductivity of steel is typically 200 times greater, and even stainless steel has a k value of about 16W/m K. Insulating materials with conductivity values below about 1.0W/m K are preferred.

The visible spectrum covers approximately 400nm (violet) to 750nm (red), or a little wider. At longer wavelengths, infrared electromagnetic radiation does of course cover a very great range of wavelengths, from about 780nm just outside the red end of the visible spectrum up to about 1.0mm. For good optical reasons, the near infrared, which extends over the approximate wavelength range 750-1400nm, is preferred for surveillance purposes. These shorter wavelengths allow better definition, and camera structures closer to those of cameras conventionally operating in the visible spectrum, which is normally taken to end at about 750nm, although some humans may be able to see up to 780nm, and some infrared illuminators operate with peak output at 730nm. While the boundary between visible and infrared wavelengths is not precise, the difference between visible and infrared illumination, cameras and surveillance is well known and understood by those skilled in the art.

In general, active infrared illuminators operate at wavelengths in the 800-925nm range, and infrared video cameras are often designed likewise for peak sensitivity in this range, commercial examples being available at 810, 850 and 915nm, for example. Generally, a camera will have a wider sensitivity range than the output frequency range of an LED illuminator, and may be sensitive to visible light as well. If exclusively infrared IR recording is required for any particular reason, a suitable filter can be used to prevent shorter wavelength light reaching the sensitive charge-coupled device in the focal plane of the camera.

The illumination means are preferably mounted outside the dome on mountings of predominantly circular form. For convenience, the illuminators may be mounted on a chord of a wheel or disk. In this way, when viewed from the side, the generally circular appearance of the mounting gives the least information to a distant observer about any change in orientation of the illuminators, or any detectable motion during a tilt operation, or to afford information as to whether the tilt axis currently lies. As already noted, illuminators may run hot, and the mountings may advantageously be provided with cooling means. Such cooling means may include physical structures, such as heat-conductive fins, or treatments, such as black or matt black colouration.

The directional illumination means may be of several different types. Typical are bulbs, light emitting diodes (LEDs), flash tubes, for example xenon discharge flash tubes, and lasers. Currently, LEDs are preferred. The illuminators may be provided in a plurality of designs even within one particular type. For example, one set of LEDs may be provided with a narrow beam angle, for example 15° for concentrating light at a distance for use with a long focal length camera lens, and another group of LEDs may be provided with a broad beam angle of 50° for more general illumination of a wide angle view for a camera with a lens of short focal length. According to the focal length of the camera being used, the appropriate illuminators may be selectively powered.

As is known in the art, pulsed LEDs allow more than their nominal peak illumination to be extracted, and their illumination pulses can be synchronised with the shutter opening of the camera.

Giving a video surveillance camera the protection of a transparent dome is beneficial as regards at least partially disguising the direction in which the camera is looking at any time, and protecting it from attack from human or animal agents or by the weather. A problem with using floodlights to illuminate an area is that, in general, floodlights cast shadows, and if the

object of the surveillance is to identify and track intruders then an illumination source close to the optical axis of the lens minimises shadows. But, especially with infrared illumination, using light sources very close to the camera lens will lead not
5 only to excessive heating within the dome, but also image degradation due to reflections and scattering at the surface and in the transparent body of the dome. Wider area illumination is very wasteful, whereas directional lighting allows the available light to be brought exactly where it is needed, with the
10 economical result that most of the light generated is used. By means of the present invention the problems of ventilating and cooling the dome, and of loss of definition and detail in the images, are substantially overcome. Placing the illumination means outside the dome allows more power to be used, better imaging to
15 be achieved, and the dome itself to be made smaller. Further, by masking the interior surface of the dome from the camera or cameras except in an unmasked transparent window, desirably sized to encompass the widest angle lens adjustment (field of view) of the camera or cameras over the tilt range provided, image
20 degradation due to reflections and scattering of light from the external illuminators is substantially reduced. Other advantages will appear from the further description herein.

One embodiment of the invention will now be described, by way of example, in the accompanying drawings. In these drawings,

25 Figure 1 is an isometric view, from a point in front and to one side, of a wall mounted surveillance apparatus in accordance with the invention;

Figure 2 is a similar view with much of the outer casing of the apparatus removed to show the general internal arrangement of
30 parts;

Figure 3 is a perspective internal view of the apparatus from one side, with outer covering and illumination means and some internal structures absent for clarity; and

Figure 4 is a front perspective view of the apparatus shown in Figure 3 but with restoration of illumination means on one side only, and of the equatorial mounting ring for the dome and some other components.

5 The external aspect of exemplary surveillance apparatus in accordance with the invention is shown in Figure 1 in a form suitable for mounting in an elevated position on a vertical wall, fully assembled. Uppermost can be seen the external cover skin 12 of a fixed wall bracket 10. Below that is the outer casing 22 of
10 a rotating pan turret 20, of generally hemispherical form, and below that is the similarly shaped but slightly smaller dome 40, with a shell 42 having a large transparent window area 46 allowing two parallel video cameras 48,50 within to cover a clear field of view between the horizontal and the downward vertical. On either
15 side of the dome are directional infrared illumination means in the form of tilting lamp housings 80, aligned with the cameras and mounted on common mounting spindles therewith, for illuminating the cameras' field of view.

Figure 2 shows substantially the same view of the apparatus
20 of Figure 1 after removal of the near side half of the wall bracket cover skin 12 and the outer casing 22 of the pan turret 20. The dome shell 42 is suitably made of polycarbonate or other infrared-transparent polymer, or infrared transparent glass. The dome shell is transparent to infrared wavelengths of the kind used
25 by the cameras and illumination means of this apparatus over its whole surface, and may be transparent to visible light, although if it is desired to hide the interior of the apparatus from observation, the shell 42 can be made of a material that is opaque to visible wavelengths. Figure 2 shows cameras 48 and 50 through a
30 cut-away portion of a visibly opaque dome shell.

It was stated above that shell 42 had a large transparent window 46. This window is created by means of an opaque mask 44, shown in Figures 3 and 4, inside the transparent shell. The mask may be a separate structure or the mask and transparent shell may

be combined, either in a single composite structure or a shell partially coated with opaque pigment, or etched, or otherwise made transparent and opaque in different regions to leave a transparent band to serve as the camera window.

5 The wall bracket portion 10 of the apparatus provides the anchorage means. It includes, internally, a wall plate 14 by means of which the apparatus can be screwed, bolted or otherwise affixed to a vertical surface, and a steel cantilever arm 15
10 extending outwardly from the wall plate and terminating in a support bracket 16 at the outer end of the arm 15 for receiving a pan shaft 24 which, as will be described below, supports the principal working part of the apparatus and is the basis of the cameras' pan mounting.

 Pan shaft 24 passes through support bracket 16 and is
15 clamped there by means of screw threaded hand wheel 27. Pan shaft 24 carries upper pan bearing race 25 and lower pan bearing race 26, on which the pan turret casing 22 can rotate about the pan shaft (Figure 4).

 The remaining significant internal elements within the wall
20 bracket cover skin are an electrical connector socket 18 and electrical cabling 19 (Figure 3), accepted by the socket, which transmits electrical power and control signals to the apparatus, and returns response signals and video output from the apparatus. The electrical cabling 19 generally includes at least power supply
25 cables and video output cables. It is possible to carry control signals over either of these as is known in the art, but it is generally preferable to use separate wiring for the control signals, such as a conventional twisted pair. Other forms of signal transmitter can of course be used, including fibre optic
30 and wireless. Especially if the apparatus is part of a set of observation stations, where typically similar installations of the apparatus are set up at a number of different locations, each apparatus can be given its own network address to uniquely identify it, and enable control signals to be routed to a specific

desired one or several of the many installations of the apparatus. Arrangements of this kind will be understood by those skilled in the art.

5 The component modules under the outer casing 22 of the rotating pan turret 20 include the motors and drives for the pan and tilt motions, and much of the controlling electronics.

10 The pan motor drive is mounted inside the pan turret 20 and comprises a pan drive static toothed pulley 28 fixed non-rotatably on the pan shaft, a pan drive toothed motor pulley 29, and an internally toothed pan drive belt 30. Pan drive motor 32 is carried on pan motor bracket 31 fixed inside the pan turret cover 22, and drives the pan drive motor pulley via a gearhead 33. Operation of the motor in either direction causes it to travel along the drive belt which cannot itself rotate because of its
15 engagement with the static pulley 28. Accordingly, the motor bracket itself is caused to rotate around the pan shaft and carries with it the turret casing 22 and all components of the turret that are mounted on it. The precise position of rotation is monitored by an angular encoder 36 mounted on the back of the pan
20 drive motor 32.

25 All the remaining parts of the pan turret 20, including its casing 22, and the dome, cameras, illumination means and tilt mounting yet to be described, rotate together with the pan motor bracket. Within pan turret outer casing 22 these include a secondary printed circuit board 38, for auxiliary control purposes, and a cooling fan 39. Electrical connection between the cabling 19 and the wiring within the rotating turret is assured by suitable slip ring connections within the turret bearing assembly.

30 All these components of the pan turret 20 are, in use, substantially concealed by the outer casing 22, and all rotate as a single whole when the pan drive operates around the vertical pan shaft 24 to rotate the turret endlessly, in either direction, about the vertical pan axis. The dome 40 is mounted below the pan

turret on equatorial mounting ring 41, and rotates with the turret as a single unit in pan mode.

The ring 41 carries side walls 95 which carry bearings for a camera cradle spindle 47 on each side of the apparatus. These
5 spindles, at their inner ends inside the dome, support opposite sides of a camera cradle 54 below which are carried the cameras 48,50 side by side. Rotation of the cradle on the spindles provides the tilting movement of the cameras, and in this embodiment the tilt range is 90° or a little more, encompassing
10 both the horizontal straight ahead position and the vertical downward position of the cameras.

Tilting is actuated and controlled by a toothed belt drive similar to that of the pan motion about pan shaft 24. In this case, a tilt drive motor 52 and gearhead 53 are analogous to the
15 pan drive motor 32 and gearhead 33. A toothed tilt drive motor pulley 49 engages a toothed drive belt 51 to turn a tilt drive camera spindle pulley 55 mounted on one camera cradle mounting spindle 47 inside the inner mask 44 and locked against one side of the camera carriage 54. An angular encoder 56 on tilt drive motor
20 52 provides the means for monitoring and thereby controlling the tilt position.

The tilt and pan motors are direct current closed loop servomotors which, with the precise position information achievable by use of the angular encoders and toothed drive belts,
25 allow precise aiming of the infrared video cameras 48,50 at all times. Movement control instructions are provided to the apparatus through cabling 19, and microprocessors on main printed circuit board 59 carried at the back of the turret 20 and on secondary printed circuit board 38 at the front of the turret thereafter
30 control the pan and tilt motion locally, using a suitable internal wiring harness, largely omitted for clarity; ribbon cable 58 is shown (Figure 3) between cameras 48,50 and main PCB 59 as an example.

Equatorial mounting ring 41 provides the connection between the turret casing 22 and the dome shell 42 and side walls 95. The outer shell 42 is transparent to infrared radiation in the operating wavelength range over the whole of its surface, which is part of a sphere. The dome would be a substantially hemispherical shell, except that it is truncated on opposite sides to allow the mounting of the illumination means 80 as close as reasonably possible to the cameras (Figure 1). Mask 44 is opaque to infrared and is painted on to the inside of the dome shell 42 leaving a window 46 of the shape best shown in Figure 3.

The optical axes of the cameras 48,50 are shown horizontal and straight ahead in all the drawings, but the pan and tilt ranges will be understood from the foregoing description. Figures 3 and 4 show the extent of the cut-out window portion 46 in mask 44, which limits the useful downward tilt range of the cameras. The geometric centre of the part-spherical shell 42 lies symmetrically between the two cameras, on the pivot axis of the camera cradle 54 defined by the axes of the opposite cradle spindles 47, which pivot axis is intersected, or close to intersected, by the optical axis of each camera. If only one camera were provided, it would preferably be centred in the cradle and its optical axis would be even more nearly perpendicular to the spherical surface of the window portion of the dome.

The illumination means 80 are in the form of lamp mounting wheels each having a broad hub 82 provided with a circular radial flange 84 and a plurality of webs 86 on either side of the flange between the flange and the hub. These are made as a single aluminium casting, aluminium being a good conductor of heat, and are painted black, to improve thermal radiation. The circumferential flange 84 and its lateral webs 86 act as fins for heat dissipation.

The illuminator mounting 80 is rotationally symmetrical, seen from the side, except for a chord 88 which is provided with six sockets, in three rows of two sockets, into which are received

jumbo light emitting diode clusters (LEDs). These products are commercially available for light emission at infrared wavelengths, as discussed above.

Each illuminator mounting 80 has its hub firmly mounted,
5 without slippage, on one of the two lateral spindles 47 so that the chordal surface 88 faces in precisely the same direction as the cameras 48,50. The LEDs are mounted to project infrared light directly away from the surface in beams which are parallel to the optical axes of the two cameras. Because of the proximity of the
10 LED clusters to the cameras, the general direction in which the infrared light is projected is substantially along the camera axes.

An important function of the mask inside the polycarbonate dome is to block out reflected and scattered light that might be
15 directed into the camera lenses, especially light that may be guided inside the transparent material of the dome by total internal reflection until it is scattered by imperfections in the clear plastic.

Spindles 47 are hollow and provided with ports 92 through
20 which power and control cabling (not shown) extends between the LED clusters on each mounting 80 and the control circuit boards within the dome and turret.

The LEDs may be of differing quality. That is to say, in the same apparatus some may operate at different wavelengths from
25 others, so that both visible and infrared illumination are available; some may emit narrow beams for distant illumination while some may emit wide beams for general wide angle illumination; and some may be controlled separately from others so as to be illuminated independently, but nevertheless preferably
30 synchronised with the camera shutter opening frequencies.

The camera cradle spindles 47 which carry the illuminator mountings 80 are made of engineering grade polyamide (nylon).

Despite the cooling fins, the mountings 80 typically reach thermal equilibrium with the surrounding air at around 100°C and the low thermal conductivity of polyamide ensures that little of that heat reaches the interior of the dome. Of course, the electronic controls and power generate heat, which is why a cooling fan such as the fan 39 is likely to be necessary. Flared lateral arches 94 project laterally outwardly from the equatorial mounting ring 41 over the illuminator mountings 80, and further serve as heat shields.

10 The cameras 48,50 are sensitive to the same infrared wavelengths around 850nm which is the peak intensity wavelength of the preferred jumbo LEDs 90. Advantageously, camera 48 is a fixed wide angle camera, and camera 50 has a variable focal length zoom facility. In this way, two video streams can simultaneously be
15 received from the apparatus, one always showing the general field of view for location purposes, the other being controllable to zoom in or out to show the whole of any scene of interest filling the useful field of view. In effect, the wide angle camera can act as a single 'finder' camera for a magnified view or scene shown by
20 the other camera. The two pictures can be shown simultaneously to an observer on separate screens, or as a picture-in-picture display on a single screen.

 Those skilled in the art will recognise that other operational choices are available with two or more cameras. For
25 example, one camera could be a thermal imaging camera, operating at the longer infrared wavelengths. One or both cameras could be designed for prime performance at visible light wavelengths. It should also be understood that while the description herein refers to a video camera, the frame rate of the camera is unspecified.
30 Video cameras can run at fast frame rates in order to provide slow motion facility on playback, or can be shot at much lower frame rates which amount, in effect, to a sequence of still photographs at, for example, several-second intervals. Different monitoring circumstances demand different frame rates. Video cameras can, of
35 course, also produce isolated single frame images, and cameras

producing such images are included within the scope of the preset invention.

CLAIMS

1. Surveillance apparatus comprising directional illumination means; a video camera; a transparent dome, mounted over the camera; a tilt mounting for the camera within the dome; a pan mounting for the camera and dome together; said directional illumination means being mounted outside the dome and locked to the alignment of the camera.
2. Surveillance apparatus according to claim 1 further comprising a second video camera on the same tilt mounting and the same pan mounting, aligned with the first said camera.
3. Surveillance apparatus according to claim 2 wherein the said video cameras are of different focal lengths.
4. Surveillance apparatus according to claim 3 wherein one camera has a fixed focal length and the second camera has a variable focal length.
5. Surveillance apparatus according to any one of claims 2 to 4 wherein the cameras are operative at different light wavelengths.
6. Surveillance apparatus according to any one of the preceding claims wherein the illumination means are operative at infrared wavelengths; the video camera or cameras are sensitive to said wavelengths; and the dome is transparent to said wavelengths.
7. Surveillance apparatus according to claim 6 wherein the camera or at least one camera has a peak sensitivity within the range 800-925nm.
8. Surveillance apparatus according to any one of the preceding claims wherein the pan mounting is adapted to provide 360° of rotation.

9. Surveillance apparatus according to any one of the preceding claims wherein the tilt mounting is adapted to provide at least about 90° of tilt.

10. Surveillance apparatus according to any one of the preceding claims wherein the interior surface of the transparent dome is masked from the camera or cameras except in an unmasked transparent window.

11. Surveillance apparatus according to claim 10 wherein the unmasked transparent window is sized to encompass the widest field of view of the camera or cameras over the tilt range provided by the tilt mounting.

12. Surveillance apparatus according to any one of the preceding claims wherein that part of the dome through which the camera or cameras can scan an external view is substantially spherical and the optical axis of the camera or cameras passes through or close to the centre of that sphere as the camera or cameras tilt.

13. Surveillance apparatus according to any one of the preceding claims wherein the camera tilt mounting passes through the dome and the directional illumination means are mounted on a portion of said tilt mounting that lies outside the dome.

14. Surveillance apparatus according to claim 13 wherein the tilt mounting includes a thermally insulated portion between the illumination means and the camera.

15. Surveillance apparatus according to claim 14 wherein the thermally insulated portion is of nylon.

16. Surveillance apparatus according to any one of the preceding claims wherein the directional illumination means are provided on two opposite sides of the dome.

17. Surveillance apparatus according to any one of the preceding claims wherein the directional illumination means include both narrow beam angle illuminators and wide beam angle illuminators which can be selectively powered according to camera focal length.

18. Surveillance apparatus according to any one of the preceding claims wherein the directional illumination means are pulsed LEDs synchronised with camera shutter opening.

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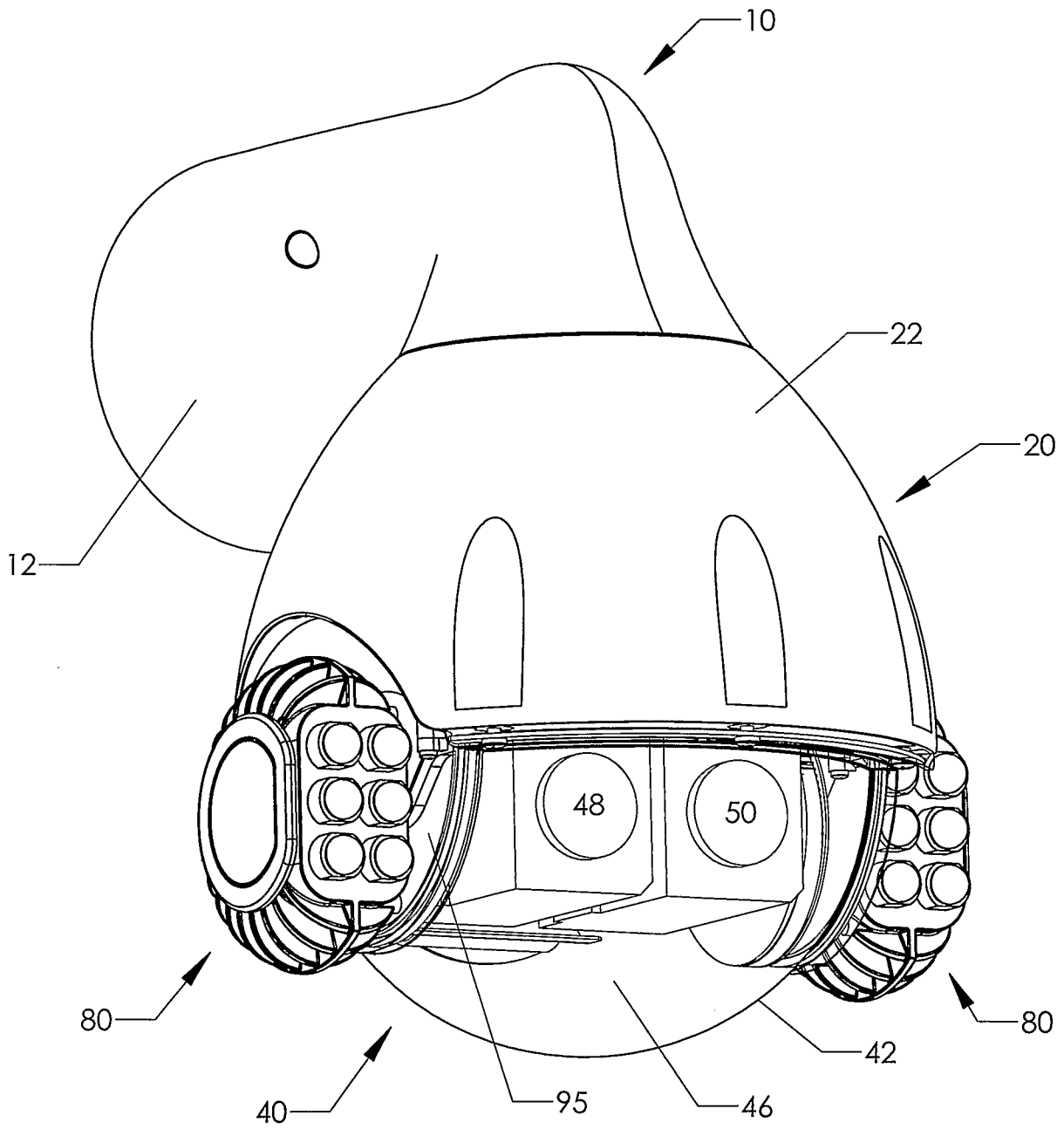


Fig. 1

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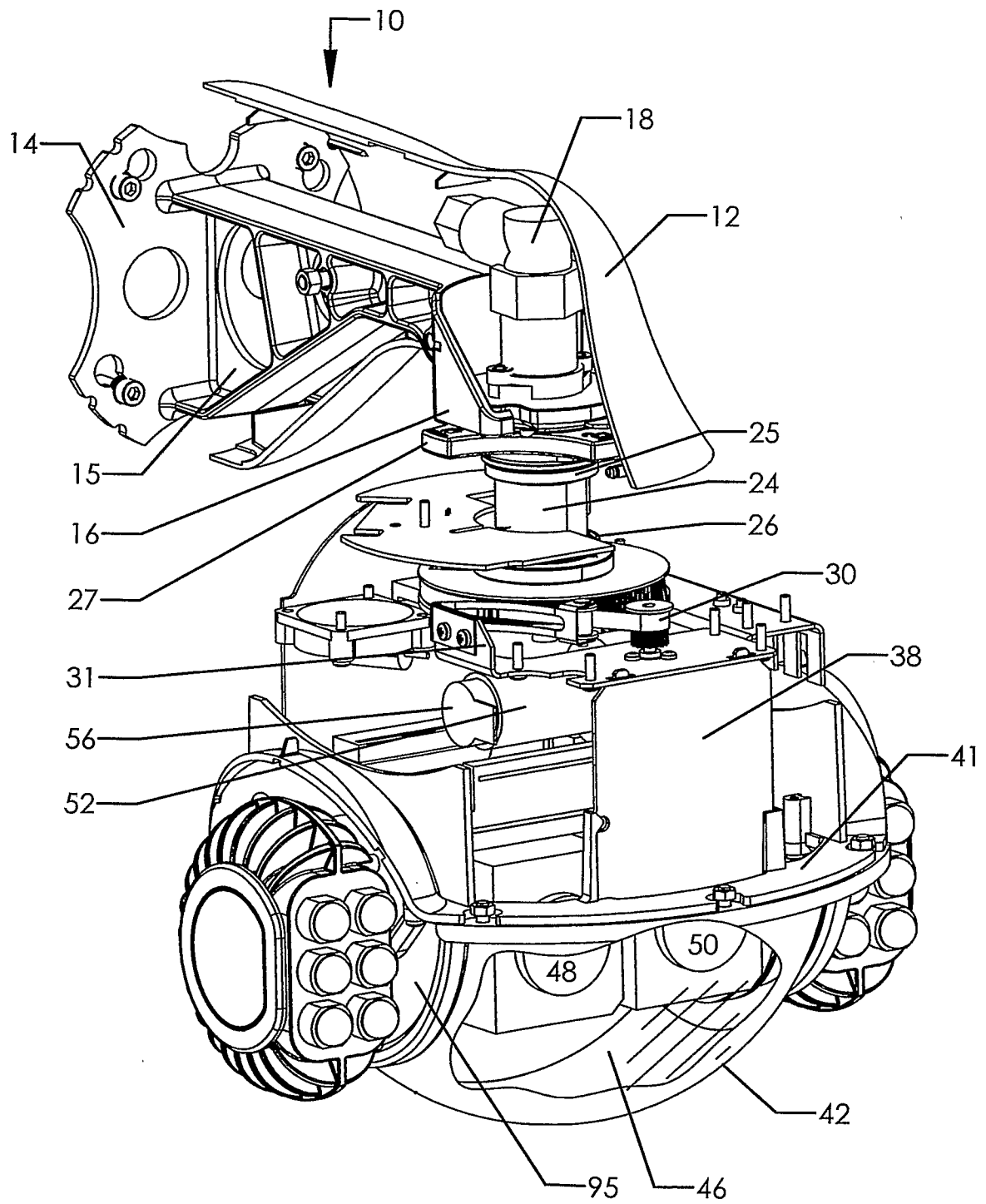


Fig. 2

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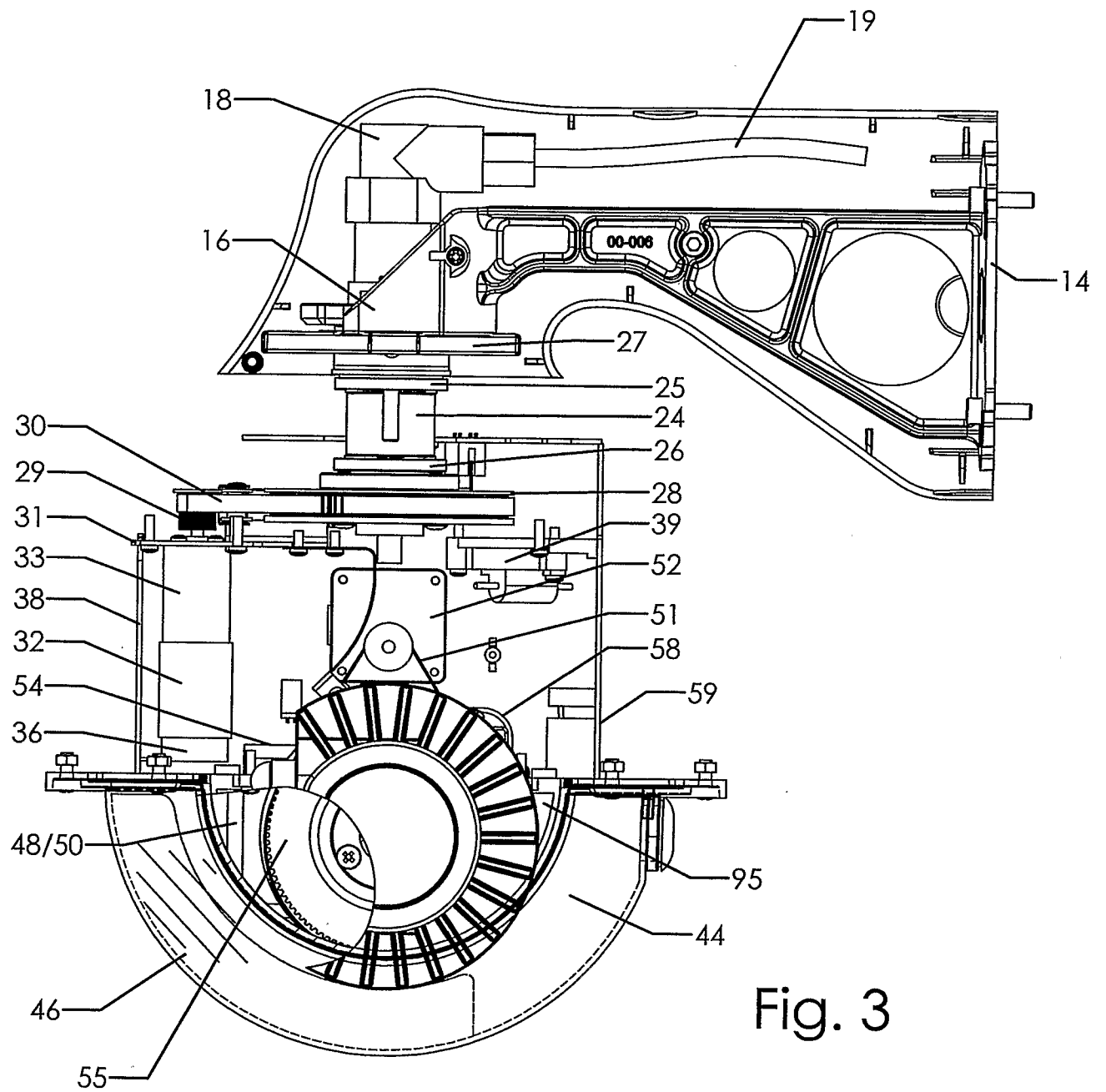


Fig. 3

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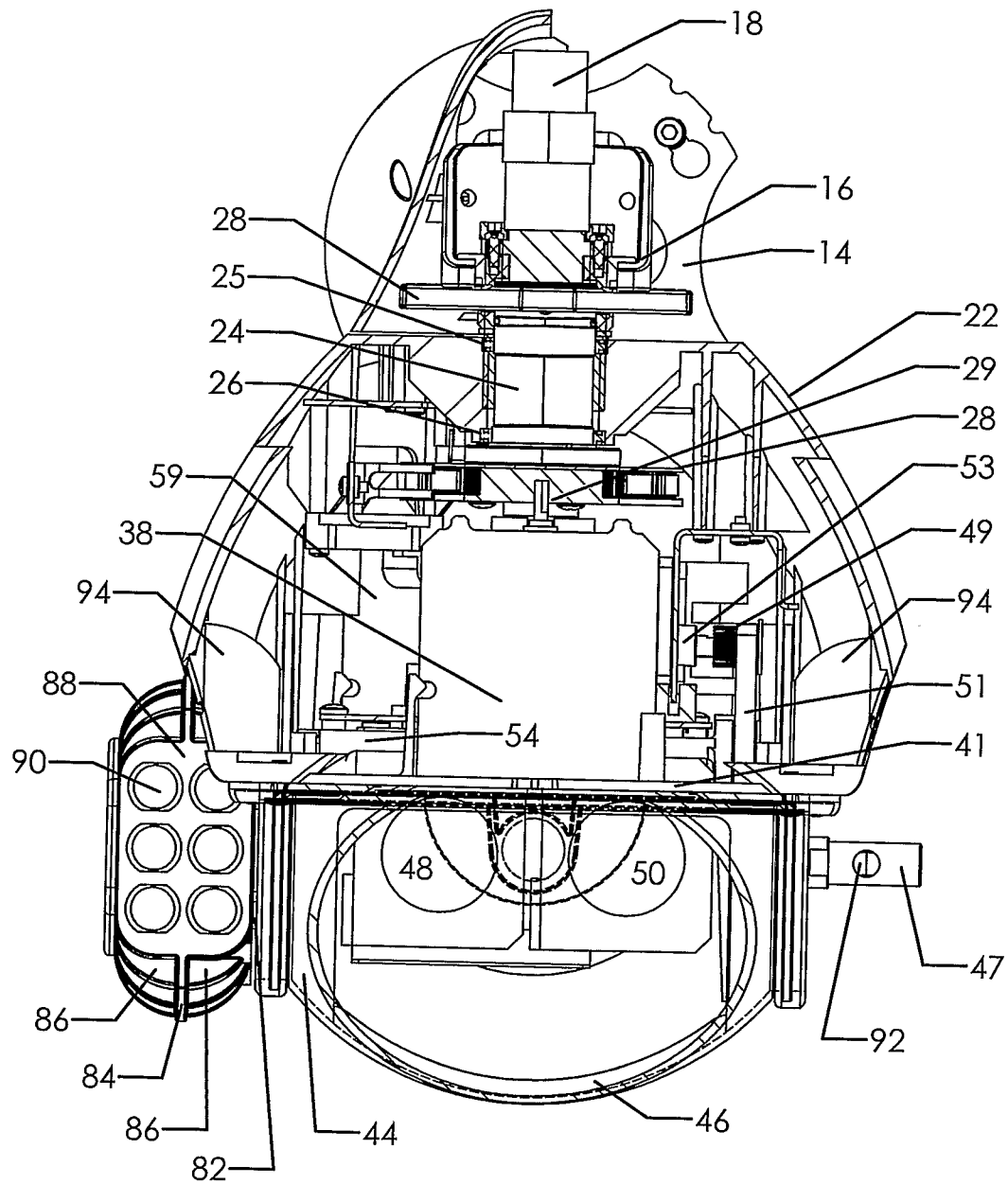


Fig. 4

INTERNATIONAL SEARCH REPORT

International application No

PCT/GB2007/003045

A. CLASSIFICATION OF SUBJECT MATTER

INV. H04N5/225 H04N5/33 H04N7/18

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 practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2005/012786 A (EXTREME CCTV INC [CA]) 10 February 2005 (2005-02-10)	1, 8, 9, 18
Y	page 2, line 5 - page 3, line 10 page 4, lines 2, 3, 11-13 page 9, lines 3-14 page 10, lines 10-18 figures 1, 3-6	2-7, 10-17
Y	WO 03/043316 A (GIN J M JACK [CA]) 22 May 2003 (2003-05-22) page 7, line 2 - page 10, line 7 page 11, line 19 - page 12, line 5 figure 3	2, 5-7, 10-17
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Further documents are listed in the continuation of Box C.



See patent family annex.

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Date of the actual completion of the international search

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Date of mailing of the international search report

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INTERNATIONAL SEARCH REPORT

International application No

PCT/GB2007/003045

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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