



Europäisches Patentamt  
European Patent Office  
Office européen des brevets



(11)

**EP 1 688 058 A1**

(12)

## EUROPEAN PATENT APPLICATION

(43) Date of publication:  
**09.08.2006 Bulletin 2006/32**

(51) Int Cl.:  
**A44C 15/00** (2006.01) **G09F 27/00** (2006.01)  
**G09F 21/02** (2006.01) **A41D 27/08** (2006.01)

(21) Application number: **06002059.1**

(22) Date of filing: **01.02.2006**

(84) Designated Contracting States:  
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR  
HU IE IS IT LI LT LU LV MC NL PL PT RO SE SI  
SK TR**  
Designated Extension States:  
**AL BA HR MK YU**

• **Tartaglia, Massimo**  
**20090 Cesano Boscone (IT)**

(72) Inventor: **Tartaglia, Massimo**  
**20090 Cesano Boscone (IT)**

(74) Representative: **Cicogna, Franco**  
**Ufficio Internazionale Brevetti**  
**Dott.Prof. Franco Cicogna**  
**Via Visconti di Modrone, 14/A**  
**20122 Milano (IT)**

(30) Priority: **04.02.2005 IT MI20050166**

(71) Applicants:  
• **AL.TA.TEK S.R.L.**  
**20094 Corsico MI (IT)**

(54) **Electric apparatus for providing a sounding and motion graphic interaction**

(57) An electronic apparatus (1) for providing a sounding and motion graphic interaction is characterized in that said apparatus comprises an electronic body (2)

including interaction means comprising sound reproduction means (4), graphic light reproduction means, and mechanical means for generating motion patterns.

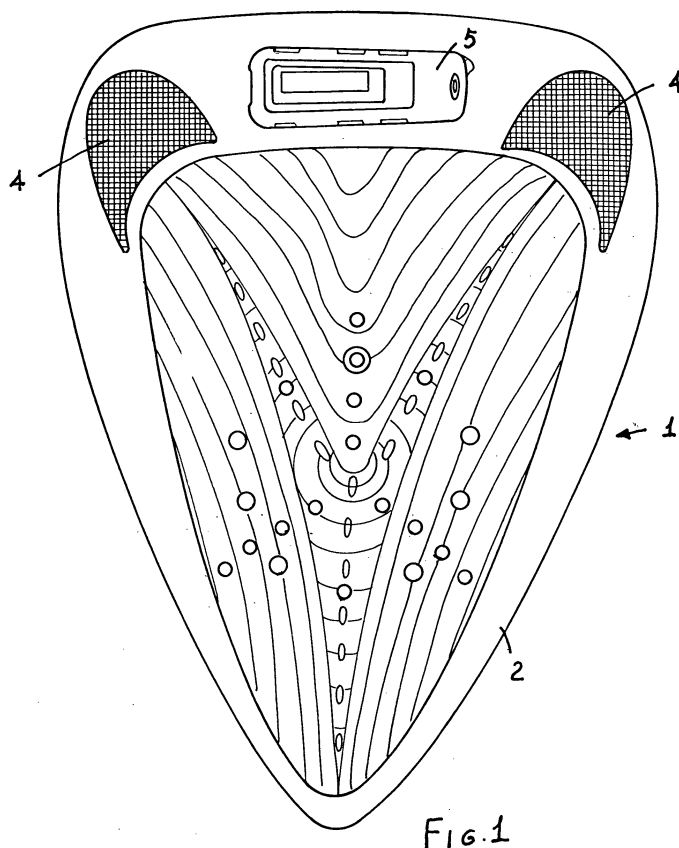


Fig. 1

EP 1 688 058 A1

## Description

### BACKGROUND OF THE INVENTION

[0001] The present invention relates to an electronic apparatus for providing a sounding and motion graphic interaction.

[0002] Electronic panels, providing variable light and graphic effects, which can be used both as advisory means and as artistic articles, are already known.

### SUMMARY OF THE INVENTION

[0003] The aim of the present invention is to provide such an electronic apparatus which comprises functional and variability characteristics improved and broadened with respect to those of prior variable light panels.

[0004] Within the scope of the above aim, a main object of the invention is to provide such an electronic apparatus which has a wide range of applications.

[0005] Another object of the present invention is to provide such an electronic apparatus which is very reliable and safe in operation.

[0006] According to one aspect of the present invention, the above mentioned aim and objects, as well as yet other objects, which will become more apparent hereinafter, are achieved by an electronic apparatus adapted to provide a sounding and motion graphic interaction, characterized in that said apparatus comprises an electronic body including interaction means consisting of sound reproduction means, graphic light reproduction means, and motion pattern generating mechanical means.

### BRIEF DESCRIPTION OF THE DRAWINGS

[0007] Further characteristics and advantages of the present invention will become more apparent hereinafter from the following detailed disclosure of a preferred, though not exclusive, embodiment of the invention which is illustrated, by way of an indicative, but not limitative, example in the accompanying drawings, where:

Figure 1 is a front elevation view of the apparatus according to the invention;

Figure 2 is a front elevation view, as partially cross-sectioned, of this apparatus;

Figure 3 is a side elevation view, as longitudinally cross-sectioned, of the apparatus according to the present invention;

Figure 4 is a side view, on an enlarged scale, showing in a detailed manner the gear wheel device;

Figure 5 schematically shows, by front elevation views, some of the several possible embodiments of the apparatus according to the invention;

Figures 6 and 7 show an analogic diagram of a microphonic VU-Meter or of a Signal from an USB Pp3 Player Source with a stereo amplifier and stereo

loudspeakers;

Figure 8 shows a so-called shifted microprocessor diagram, i.e. one or more sequential light patterns which are shifted independently from the sound interaction;

Figure 9 shows an analogic diagram Moviled1, i.e. an interaction in the presence, in the environment in the front of the electronic body, of a body and its pattern movements with a shifting light pattern arrangement;

Figure 10 is a block diagram of the apparatus according to the present invention;

Figure 11 is a front elevation view of a further embodiment of that same apparatus;

Figure 12 is a view similar to figure 11, showing the motion possibilities of the apparatus of figure 11;

Figure 13 is a further front elevation view of a further embodiment of the apparatus according to the present invention, as applied to a cloth article;

Figure 14 is a front elevation view of a woman subject wearing a cloth article including the apparatus according to the present invention, in a further embodiment thereof; and

Figure 15 shows yet another modified embodiment of the apparatus shown in figure 14.

### DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0008] With reference to the number references of the above mentioned figures, the apparatus according to the invention, which has been generally indicated by the reference number 1, comprises an apparatus electronic body 2 power supplied by a battery power supply, generally indicated by the reference number 3, and adapted to a mains power supply through a transformer (9-12 volts) with independent functions, which can be switched on/off either individually or simultaneously.

[0009] More specifically, the functions of the apparatus comprise:

- a sound reproduction or playback with stereo amplifier and loudspeaker 4, from a USB Pen Radio/MP3 Player source, generally indicated by the reference number 5, with a connection USB thereto;
- an interaction to sound vibrations, reproduced thereby, or coming from the outside environment, with a vu-meter type of light pattern playing;
- an interaction with sound or sounding vibrations, reproduced thereby or coming from an outside environment, with intermittent driver pulses driving a very high speed motor 6, the direction and speed whereof can be changed by changing the driver pulses;
- one or more sequential shifting light patterns, independent from the sounding or sound interaction;
- an interaction to the presence, in the environment in the front of the subject electronic body, of a body and its motions with a shifting light pattern;

- an interaction in the presence, in the environment in the front of the subject electronic body, of a body and its motions with a vu-meter type of light patterns (an increase of the body motion speed > vu-meter peak);
- an interaction in the presence, in the environment in the front of the subject electronic body, of a body and its motions with intermittent driver pulses for the high speed motor 6, having a speed and rotary direction which can be changed by changing the driver pulses.

**[0010]** All the above mentioned interactions being detected by environment sensors such as phonic, presence, ultrasound or minicam types of sensors.

**[0011]** Thus, by the subject electronic body, and exploiting either all its function or a part thereof, it is possible to provide:

- multi-interactive stereo panels-reproducing or playback devices, as schematically indicated by the reference number 7 in figure 5, in a plurality of designs, color, graphic representations or photographic/choreographic light variations, depending on the fantasy of the maker, from existing copyrights.

**[0012]** Moreover, the article graphic pattern and design can represent abstractions, fractals, landscapes, photos, music, movies, strip cartoons characters and so on.

**[0013]** The interaction between a graphic representation and a light choreography can be of two types:

- a) a graphic representation, always well discernible, covering the light choreography, and appearing only as the light devices are switched on, the light emitted by said light devices passing through the graphic representation, for example on a paper medium or support having any suitable gram weights, or on a clear/semiopaque PVC or medium, provided with the screen printed graphic representation and having either a suitable gram weight, or being semiclear.
- b) a light graphic and choreographic representation, always and simultaneously well defined with the light choreography, the light bodies of which are arranged on the graphic representation and accordingly being discernible both in a switched off and a switched on condition thereof.

**[0014]** The apparatus can be made according to a plurality of modified embodiments.

**[0015]** A first embodiment, shown in figures 1-4, comprises the electronic body 2, including all the electronic components, in smd, or mixed smd/pht, or in a fully pht arrangement, as assembled on a printed circuit board 8, either of a rigid or flexible nature, and so contoured as to fit the design requirements.

**[0016]** The assembly is enclosed between a front clear PVC panel 10, processed and colored according to the design imprinting of the article or object and with a screen

printed graphic representation thereon, or a representation printed on a paper medium arranged behind the clear face of the panel.

**[0017]** The body 2 comprises, moreover, a plastics material rear cover 9, having a thickness suitable to hold therein the power supply batteries, the two loudspeakers, a housing or recess for the USB Pen Radio/MP3 Player and high speed reversible motor, and a toothed disc-cover element, pivoted at a middle of the primary cover.

**[0018]** The latter must be at first fixed to a wall and then a fulcrum point, the primary cover and the remaining part of the multi-interactive panel being engaged by a snap action.

**[0019]** The gear wheel 11 of said motor 6 will interactively drives the serrated perimeter 12 of the disc-small cover 13, thereby providing, through the panel, an effect of short and quick clockwise and anti-clockwise displacements, interacting either with the sound vibrations or the movable a body in the front thereof.

**[0020]** A second embodiment of the apparatus is substantially similar to the first above disclosed embodiment, the front PVC panel being however omitted.

**[0021]** In this second embodiment, the printed board circuit only supports the smd components, including the light bodies (such as smd LED), which are patterned and colored in the panel frame in the screen printing operation according to the design requirements, and being perforated through perforating template for housing an USB Pen Player and related loudspeakers.

**[0022]** The graphic or photographic representation can be also printed on a regular non-photographic white paper medium, for example of an inkjet type 14, and adapted to meet target design requirements and being arranged at the central part on the smd LED choreography and the other smd components.

**[0023]** For overcoming insufficient quality problems, an electronic circuit clear resin coating 15 could be applied to embed the components therein, and smooth the printed material bearing surface, while allowing the smd LED light to perfectly pass therethrough.

**[0024]** The thus supported printed material, being then plasticized to provide a protective and clamping arrangement.

**[0025]** The other non-smd components, such as environment sensors, power supply batteries, pushbuttons and motor can be assembled on the opposite face of the printed circuit, together with the primary cover therefor.

**[0026]** The apparatus according to the invention can be used in different manners and for different applications, such as:

furniture articles in general (chairs, tables, depth-effect mirrors, cubes for discotheques, armchairs, sofas, doors, curtains, and so on);

furniture fittings (such as pictures and frames, trays, ashtrays, plates, glasses, bottles, vases, cushions, ornament sculptures, vinyl records, compact discs, technologic art works up to the third dimension,

gadgets in general and so on);  
 panels, casings, rotary cubes, and so on, for advertising purposes, up to a large size;  
 clothing articles and accessories in general (two-piece costumes for dances as shown in figure 14 or 15, risqué clothing, small caps, t-shirts, jeans, ties, bow ties, canes, shirts, belts, bracelets, watches, suspenders, man-woman high fashion articles, and so on);  
 adhesive and stick-on articles, and so on;  
 artistic electric and electronic apparatus (musical stereo or multi-interactive surround playback devices with a simultaneous decorating panel function).

[0027] Articles or object which can be made can further comprise : electronic and electric home use devices, such as PC and HiFi assemblies, furniture articles, cloth articles, game articles, gadgets, artistic arrangements to be used either for a private, promotional, advertising application or for a public use.

[0028] Figures 13-15 show possible application examples in the cloth article field.

[0029] In electric and electronic home article field, said articles could comprise audio-video playback devices, stereo and/or surround, multi-interactive apparatus which, together with the subject apparatus will simultaneously operate as decorating panel.

[0030] Figures 6 and 7 show an analogic diagram of a Vu-Meter Microphonic arrangement or of a signal coming from a USB MP3 Player source with related stereo amplifier and loudspeakers (sound reproduction or playback by stereo amplifier and loudspeakers, from a USB Pen Radio/MP3 Player source, with an USB connection or link, and interacting with sound vibrations, reproduced thereby or coming from the outer environment, with a Vu-Meter type of light pattern).

[0031] The Audio signal, as detected by an environment sensor of a microphonic capsule type (sound vibrations coming from the outside environment) or the electric signal of one of the two stereo channels in the preamplifier stage (sound vibrations produced by the panel built-in USB Pen Radio/MP3 Player), is amplified and split through cascade operational means driving seven vu-meter "last peak" levels on LED loads.

[0032] Before splitting said signal it is sent to said cascade operational means, through a sensitivity automatic adjusting stage, (the so-called "switch") also based on operational stages having a reference voltage  $V_{RIF}$ , designed for holding the output signal at a constant value as the inlet signal volume changes.

[0033] If the sound signal is produced by the USB Pen Radio/MP3 Player (integrated or built-in in the panel), then this signal will be further amplified by a stereo operational stage and reproduced on panel built-in loudspeaker.

[0034] The assembly is supplied at  $V_{cc}=9V$ .

[0035] Figure 8 shows a shifted microprocessor diagram, i.e. one or more sequential light patterns which are

shifted independently from the sound interaction.

[0036] The hardware only comprises a micro 8pin of a 12C508 Microchip controlling both the on/off function and 5 outputs on LED loads, with one or more shifting pattern sequences provided by an asm (assembler) software program.

[0037] The device is power supplied at  $V_{cc}=9V$  clamped at 5V by a voltage adjuster or clamping device LM.

10 [0038] Figure 9 shows an analogic diagram Moviled1, i.e. an interaction to the presence, in the environment in the front of the subject electronic body, of a body and motion pattern thereof with a shifting light pattern.

15 [0039] The 40KHz signal generated by a transmitting ultrasound environment sensor, suitably driven by NAND stages generating a 40KHz square wave, if reflected by a front body or the motion thereof, is transmitted to a receiving ultrasonic environment sensor detecting it.

20 [0040] Said signal, after amplification by BJT and operational amplifier stages, drives the inputs of an integrated counter or HEF4017B shifter, the ten output levels of which in turn drive the LED loads, with shifting startings separated by stop periods because of front movable body.

25 [0041] The assembly is supplied by a  $V_{cc} = 9-12V$ .

[0042] It has been found that the invention fully achieves the intended aim and objects.

30 [0043] In fact, the invention has provided an apparatus which can be used in a lot of application fields, from the cloth article to the furniture field and others, adapted to open in response to sound or motion patterns, outside of the apparatus or produced thereby, with graphic and light effects.

35 [0044] In practicing the invention, the used materials, as well as the contingent size, can be any, according to the requirements and the status of the art.

## Claims

40

1. An electronic apparatus for providing a sounding and motion graphic interaction, **characterized in that** said apparatus comprises an electronic body including interaction means having sound reproduction means, light graphic reproduction means and motion pattern generating mechanic means.

45

2. An apparatus, according to claim 1, **characterized in that** said apparatus is interactively responsive to sound reproduction and stereo amplifier and loudspeaker means, driven by an USB Pen Radio/MP3 Player source, and being coupled to an connection to the USB.

50

55 3. An apparatus, according to claim 1, **characterized in that** said apparatus is interactively responsive to sound vibrations, reproduced thereby or coming from an outside environment, with a vu-meter type

of light game.

4. An apparatus, according to claim 1, **characterized in that** said apparatus is interactively responsive to sound vibrations, reproduced thereby or coming from an outside environment, with intermittent driver pulses driving a high speed motor having a reversible rotary speed and direction which can be changed by changing the driver pulses.
5. An apparatus, according to claim 1, **characterized in that** said apparatus comprises one or more sequential shifting light patterns, independent from sound interaction events.
6. An apparatus, according to claim 1, **characterized in that** said apparatus is interactively responsive to the presence, in the environment in the front of said electronic body, of a body and its motion pattern with a shifting or variable light pattern.
7. An apparatus, according to claim 1, **characterized in that** said apparatus is interactively responsive to the presence, in an environment in the front of said electronic body, of a body and its motions with a vu-meter type of light pattern, with an increase of the motion speed of the body > vu-meter peak.
8. An apparatus, according to claims 1 and 7, **characterized in that** said apparatus is interactively responsive to the presence, in said environment in the front of said electronic body, of a body and its motions while providing intermittent driver pulses driving said very high speed motor.
9. An apparatus, according to one or more of the preceding claims, **characterized in that** said apparatus comprises multiple interactive modes of operation which can be detected by phonic, presence, ultrasound or minicam environmental sensors.
10. An apparatus, according to one or more of the preceding claims, **characterized in that** said apparatus comprises stereo multi-interactive panels/play-back arrangements, providing a plurality of design/color/graphic or light photographic/choreographic representation modified patterns.
11. An apparatus, according to one or more of the preceding claims, **characterized in that** said patterns represent abstractions, fractals, landscapes, photos, music, movie/cartoon characters and so on.
12. An apparatus, according to one or more of the preceding claims, **characterized in that** said patterns are always well defined to cover the light choreography which is detectable only as the light devices are switched on, said switched on light devices emitting light passing through a target graphic representation on a paper medium of a suitable weight or on a transparent/semi opaline or clear PVC medium, bearing a screen printed graphic pattern and having a suitable weight.
13. An apparatus, according to one or more of the preceding claims, **characterized in that** said graphic pattern and light choreography are always and simultaneously well defined, with the light bodies being arranged on said graphic pattern and being well defined both in a switched off and in a switched on condition.
14. An apparatus, according to one or more of the preceding claims, **characterized in that** said electronic body comprises a plurality of electronic components, in a smd or mixed smd/pht, or in a full pht arrangement, being assembled on a rigid or flexible printed board being enclosed between a front clear PVC panel, processed and colored according to an article design imprinting and with a graphic pattern screen printed thereon or on a paper medium, arranged beyond a panel clear face.
15. An apparatus, according to one or more of the preceding claims, **characterized in that** said body comprises a plastics rear primary cover of thin thickness, holding a battery power supply, two loudspeakers, a housing for said USB Pen Radio/MP3 Player and high speed motor a further serrated disc-small cover being pivoted at a middle portion of said primary cover which is fixed to a wall and snap engaged at a fulcrum, said motor having a gear wheel adapted to transmit its inter-active movement to a serrated contour of said disc-small cover, thereby providing said panel with a front effect of short and quick clockwise and anti-clockwise displacements interactive either with said sound vibrations or with said movable body arranged in front of said apparatus.
16. An apparatus, according to one or more of the preceding claims, **characterized in that** said apparatus does not comprise any front PVC panels.
17. An apparatus, according to one or more of the preceding claims, **characterized in that** said printed board substantially exclusively supports smd components, included the light bodies (smd LED's), that said printed board being contoured and colored in its frame as a screen printing step is performed and being then perforated for housing said USB Pen Player and loudspeakers.
18. An apparatus, according to one or more of the preceding claims, **characterized in that** said graphic or photographic pattern is printed on a regular white paper medium, of a non photographic contoured

inkjet paper material arranged on a central part above said smd LED's and smd components.

19. An apparatus, according to one or more of the preceding claims, **characterized in that**, for an insufficient overlapping quality printed material, a transparent resin coat for electronic circuits is provided for embedding said components therein, and being adapted to smooth said printed medium bearing surface, while allowing the smd LED's light to perfectly pass therethrough. 5
20. An apparatus, according to one or more of the preceding claims, **characterized in that** the assembled printed material is plasticized for protecting and clamping it. 10
21. An apparatus, according to one or more of the preceding claims, **characterized in that** non smd components, such as said environment sensors, battery power supplies, push buttons and motor are assembled on an opposite side of said printed board, said opposite side also supporting said primary cover. 15
22. An apparatus, according to one or more of the preceding claims, **characterized in that** said apparatus has one or more of the following modes of operation and applications: 20  
furniture articles in general (chairs, tables, depth-effect mirrors, cubes for discotheques, armchairs, sofas, doors, curtains, and so on); furniture fittings (such as pictures and frames, trays, ashtrays, plates, glasses, bottles, vases, cushions, ornament sculptures, vinyl records, compact discs, technologic art works up to the third dimension, gadgets in general and so on); panels, casings, rotary cubes, and so on, for advertising purposes, up to a large size; 30  
clothing articles and accessories in general (two-piece costumes for dances, risqué clothing, small caps, t-shirts, jeans, ties, bow ties, canes, shirts, belts, bracelets, watches, suspenders man-woman high fashion articles, and so on); 35  
adhesive and stick-on articles, and so on; 40  
artistic electric and electronic apparatus (musical stereo playback or multi-interactive surround playback devices with a simultaneous decorating panel function). 45  
50
23. An apparatus, according to one or more of the preceding claims, **characterized in that** said apparatus can be used for making articles in one or more of the following fields: electronic and electric home use devices, such as PC and HiFi assemblies, furniture articles, cloth articles, game articles, gadgets, artistic arrangements private, promotional, advertising or a 55

public applications.

24. An apparatus, according to one or more of the preceding claims, **characterized in that** said apparatus comprises an analogic diagram of a microphonic Vu-Meter or of a signal from an USB Mp3 Player source with stereo amplifier and loudspeaker means (sound reproduction with stereo amplifiers and loudspeakers, from an USB Pen Radio/MP3 Player source with a connection thereof to an USB and interaction to sound vibrations, reproduced thereby or coming from an outside environment, with a Vu-Meter type of light pattern) in which the audio signal, detected by a microphonic capsule environment sensor (sound vibrations coming from the outside environment) or the electric signal of one of the two stereo channels in a preamplifier stage (sound vibration produced by the USB Pen Radio/MP3 Player built-in in said panel), is amplified, split and fed to cascade operational components driving seven "last peak" vu-meter levels on LED loads. 5
25. An apparatus, according to one or more of the preceding claims, **characterized in that**, before splitting said signal on said cascade operational components, said signal passes through a sensitivity automatic adjuster stage, or "switch", also comprising operational stages having a reference voltage  $V_{RIF}$ , and holding the output signal at a constant value as the inlet signal volume changes. 10
26. An apparatus, according to one or more of the preceding claims, **characterized in that**, as said sound signal is produced by the USN Pen Radio/MP3 Player built-in in said panel, then said signal is further amplified by a stereo operational stage and played back on loudspeaker loads built-in in said panel. 15
27. An apparatus, according to one or more of the preceding claims, **characterized in that** said apparatus is supplied by a Vcc power supply 9V. 20
28. An apparatus, according to one or more of the preceding claims, **characterized in that** said apparatus comprises a shifted microprocessor arrangement, i.e. one or more sequential light shifting patterns independent from any sound interactions, including a hardware, exclusively consisting of a micro 8pin of a 12C508 Microchip, controlling both the on/off function and 5 outputs on LED loads, with sequences of either one or more pattern shiftings derived from an asm( assembler) software program. 25
29. An apparatus, according to one or more of the preceding claims, **characterized in that** said apparatus is power supplied at  $V_{cc} = 9V$ , clamped at 5V by a voltage adjuster or clamping device. 30

30. An apparatus, according to one or more of the preceding claims, **characterized in that** said apparatus comprises an analogic arrangement Moviled 1, i.e. providing an interaction to the presence, in said environment in the front of said electronic body, of a body and its motions with a shifting light pattern, in which a 40KHz signal, generated by an ultrasound transmitting environment sensor, and driven by NAND stages generating a 40KHz square wave, if reflected by a front arranged movable body, is transmitted to an environment ultrasonic receiving sensor detecting said signal and, upon a suitable amplification of said signal by bjt and operational stages, drives the inputs of an integrated counter or HEF4017B shifter, having ten output levels driving the LED loads with shifting startings spaced by stop periods due to the presence of the movable body.
31. A cloth article , **characterized in that** it comprises an electronic apparatus for providing a sounding and motion graphic interaction, comprising an electronic body including interaction means including one or more reproduction means for reproducing sounds and/or a light graphic.
32. A cloth article, according to claim 31, **characterized in that** said cloth article comprises motion generating mechanical means.

5

10

15

20

25

30

35

40

45

50

55

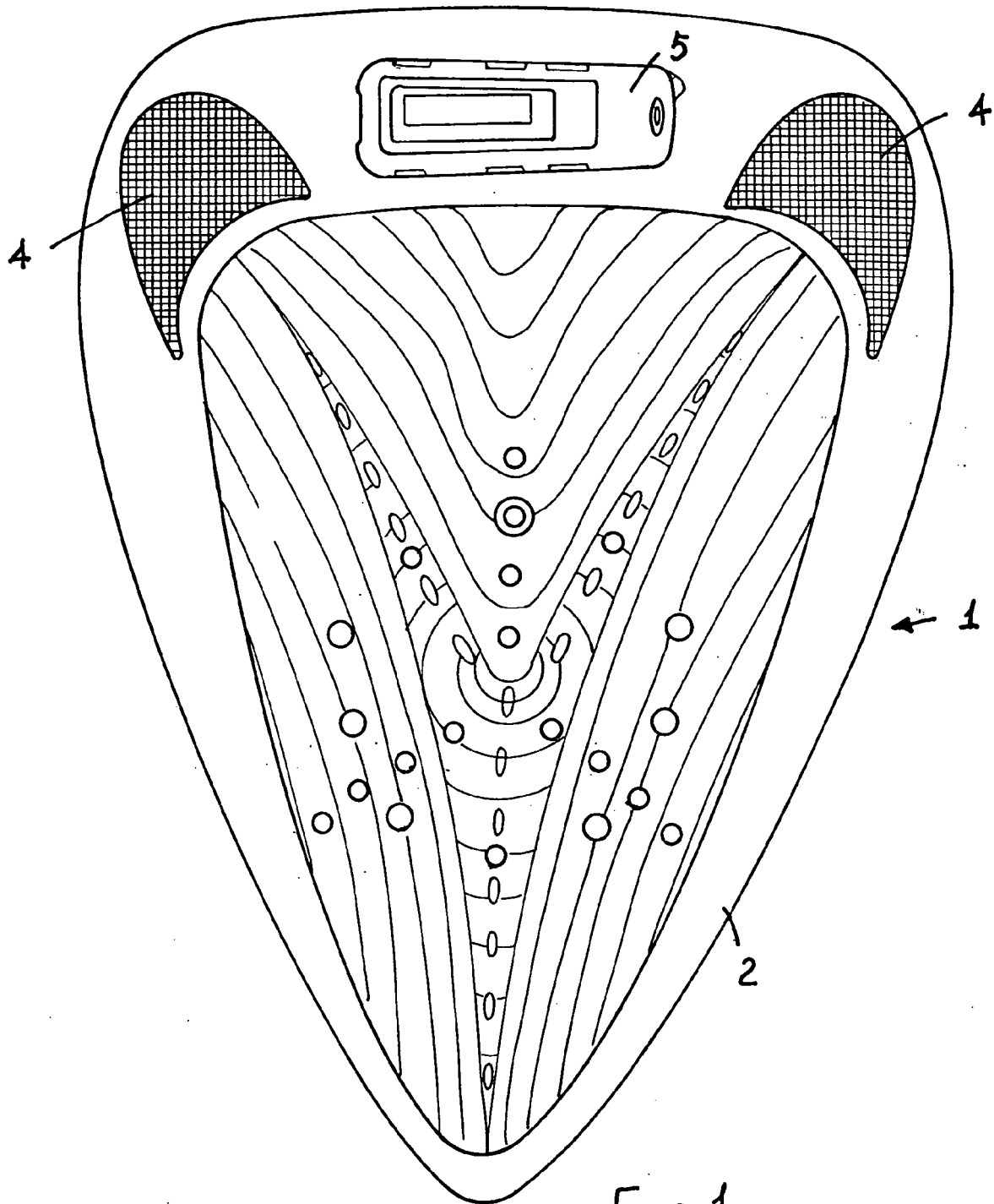
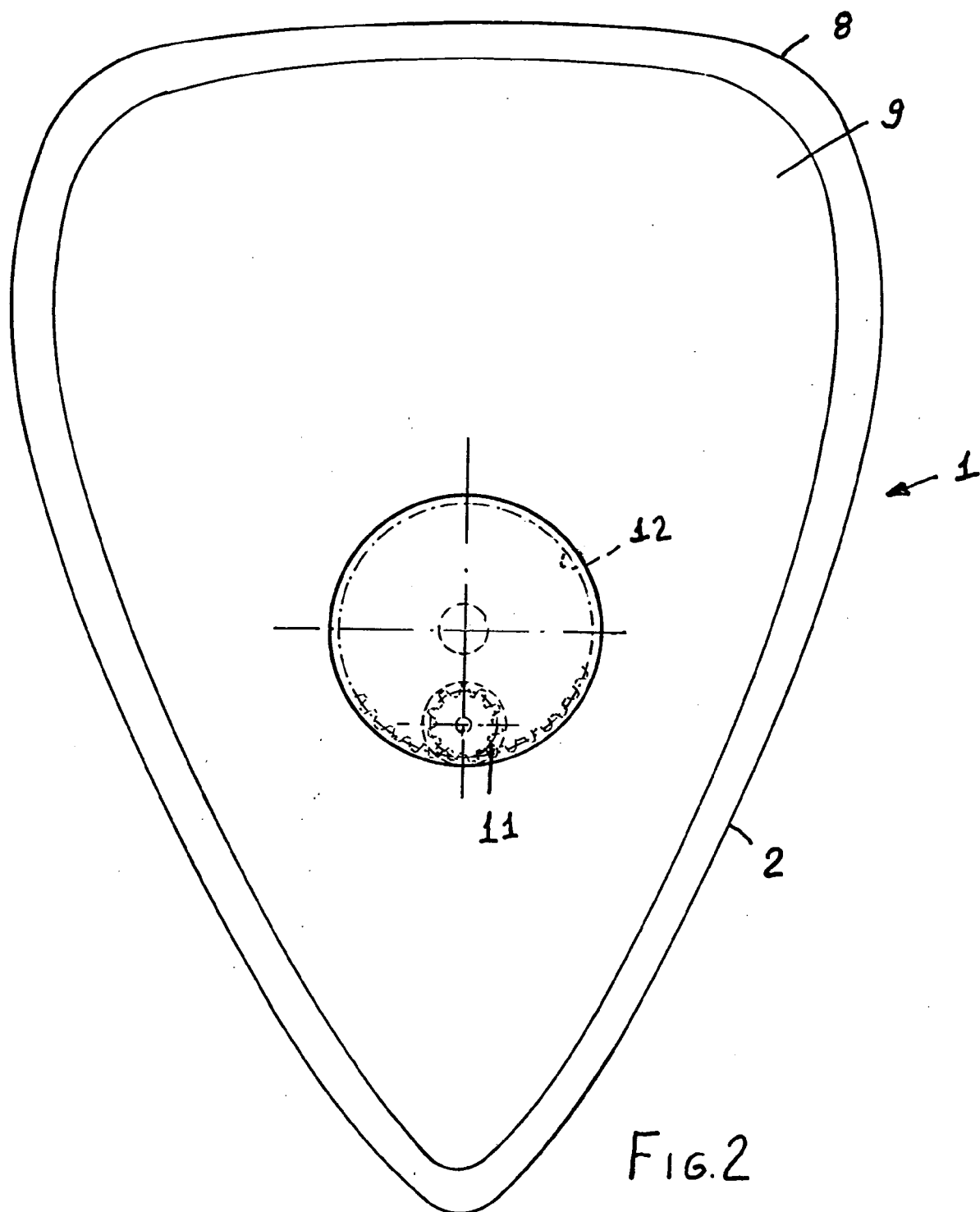


FIG. 1





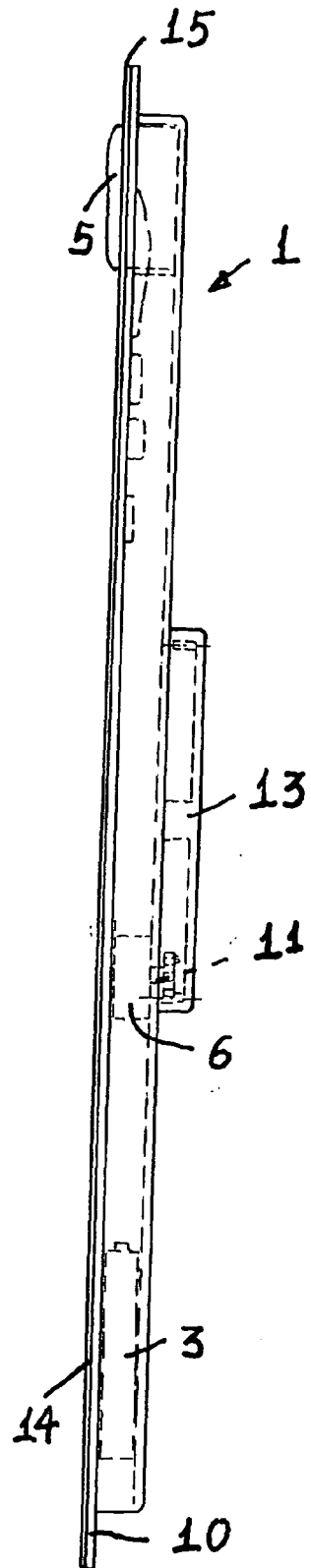


FIG. 3

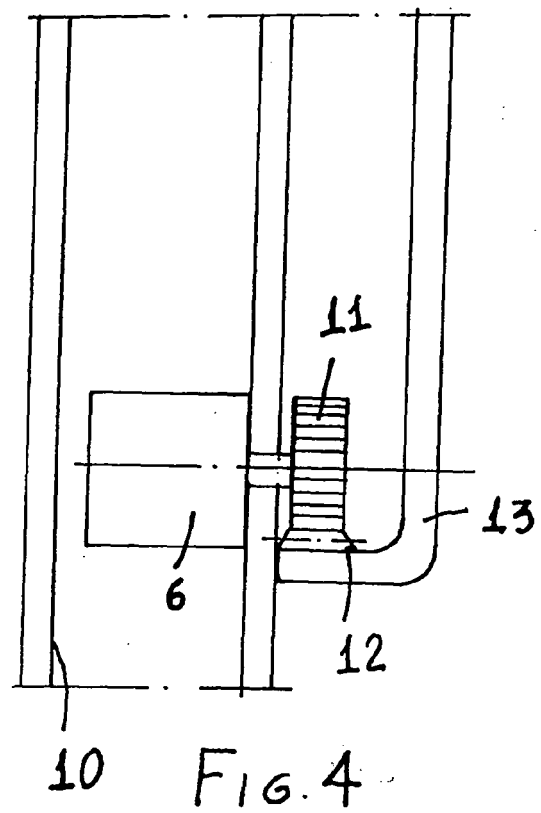


FIG. 4

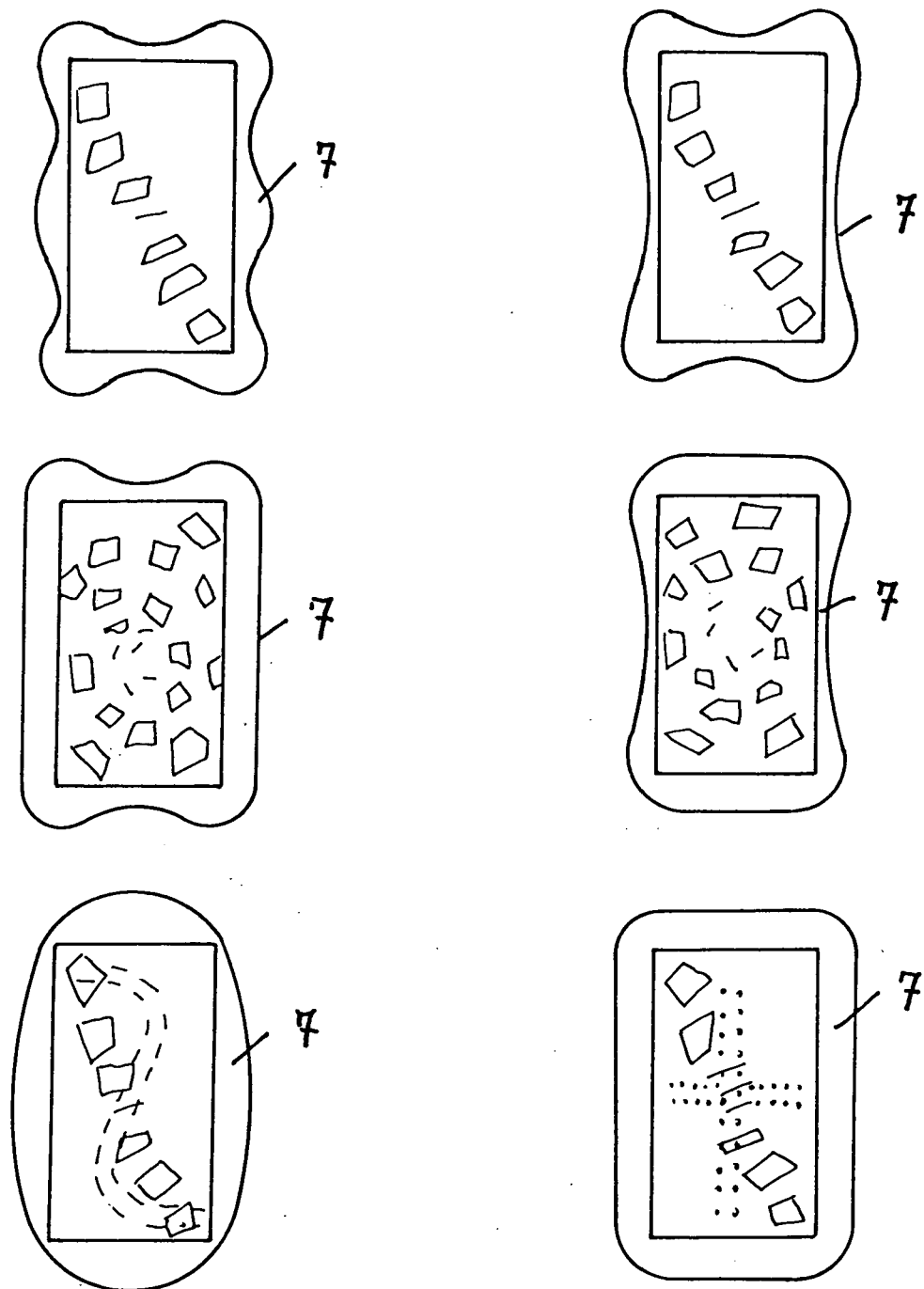


FIG. 5

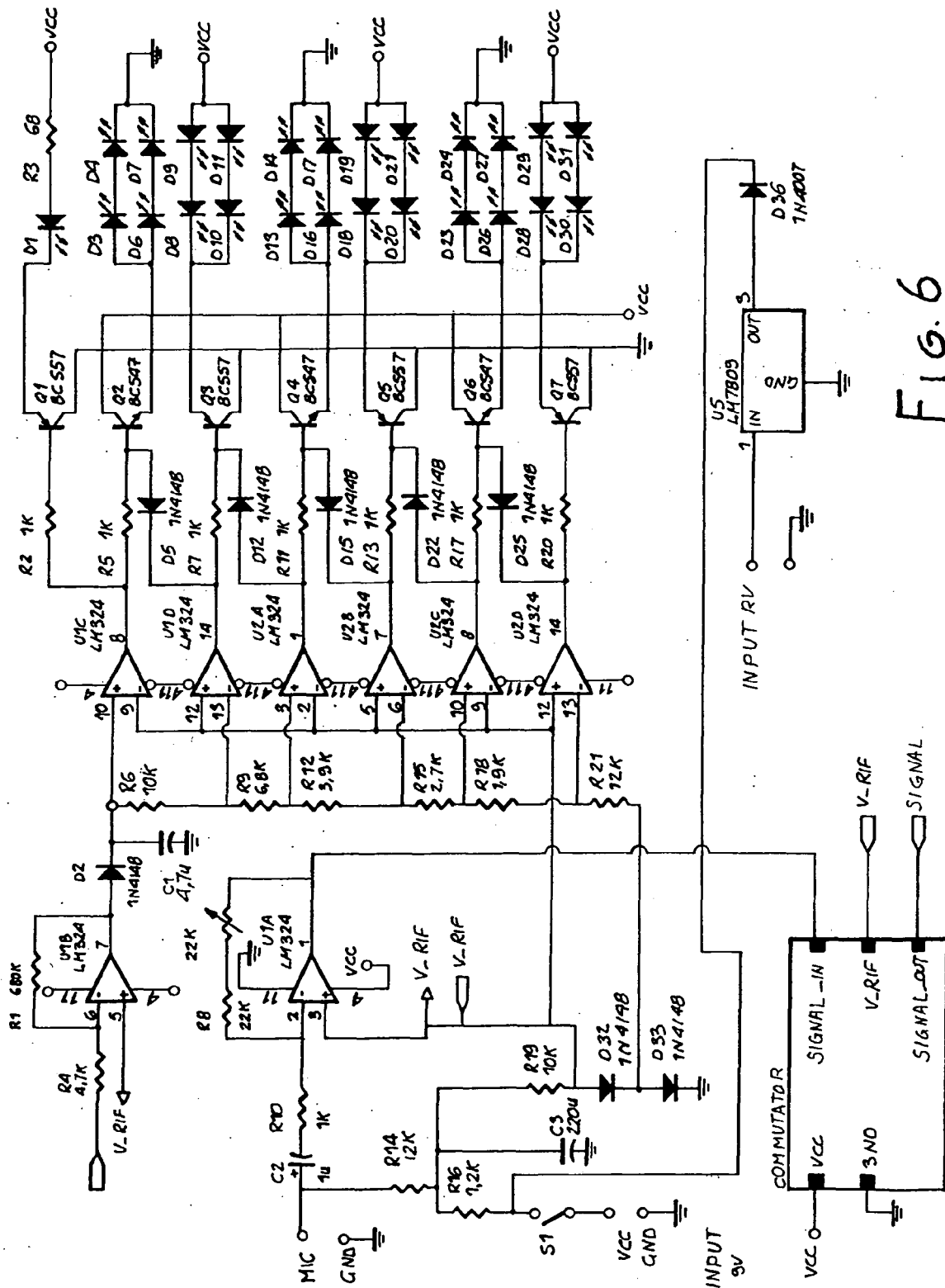


FIG. 6

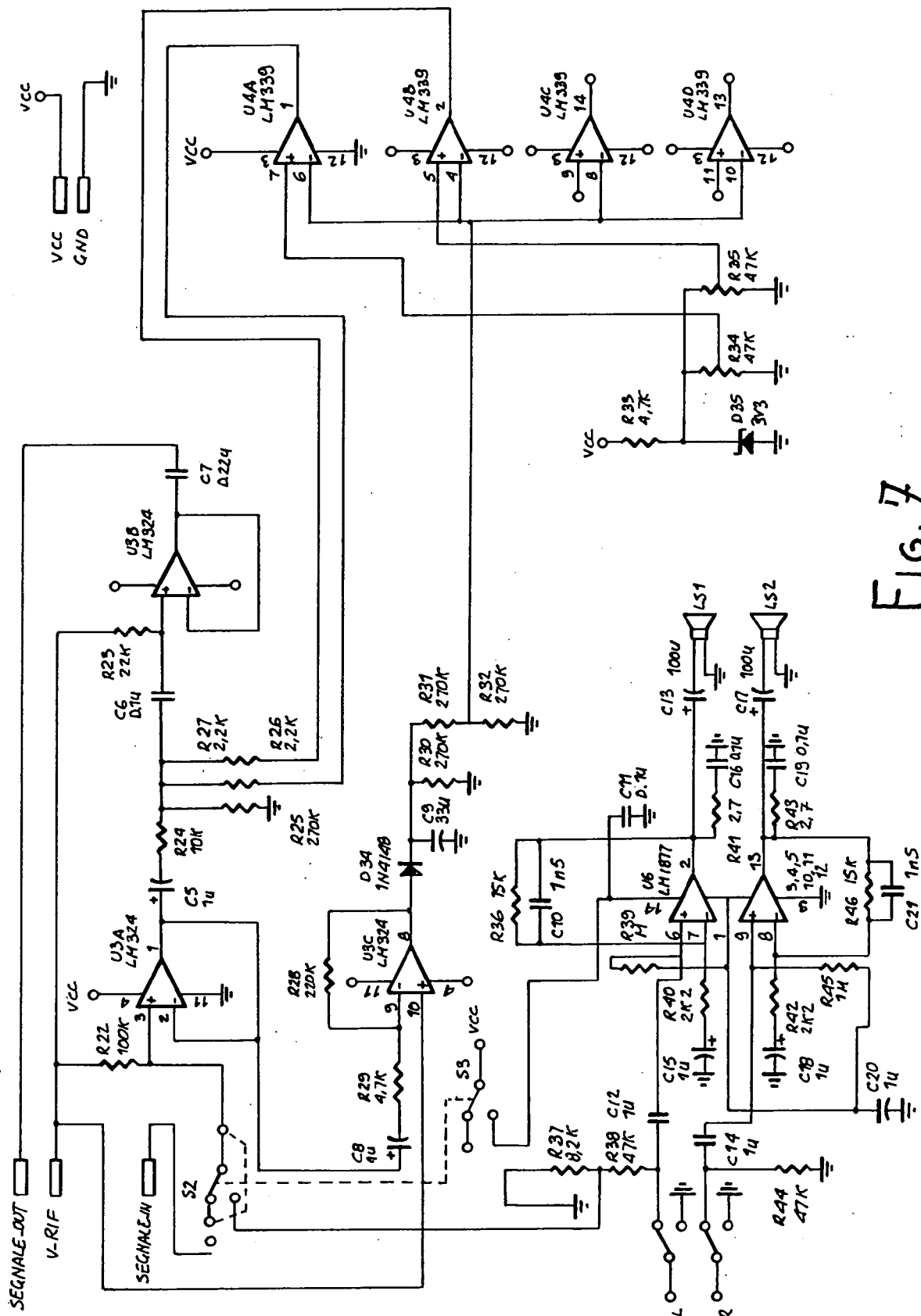


FIG. 7

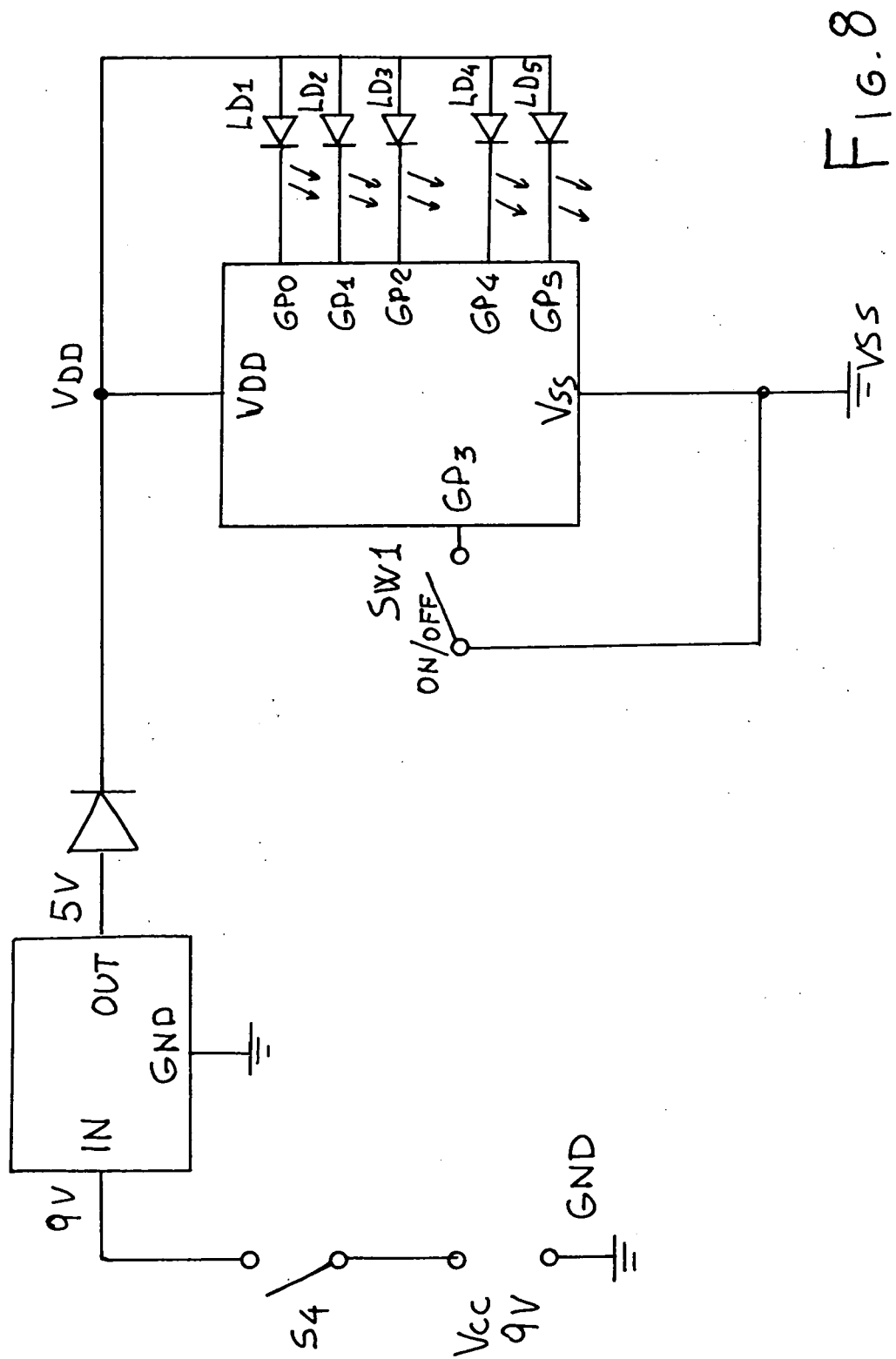


FIG. 8

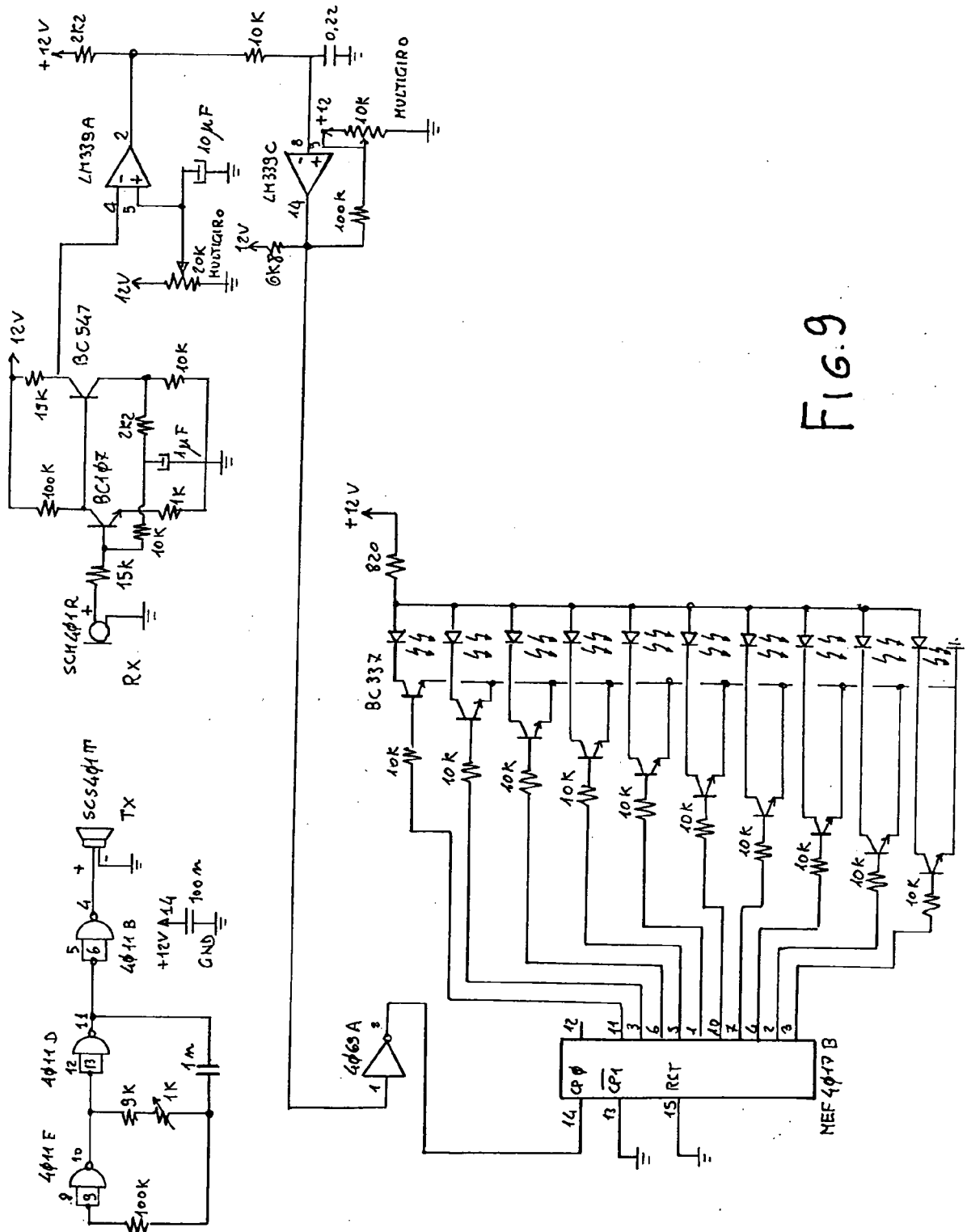


Fig. 9

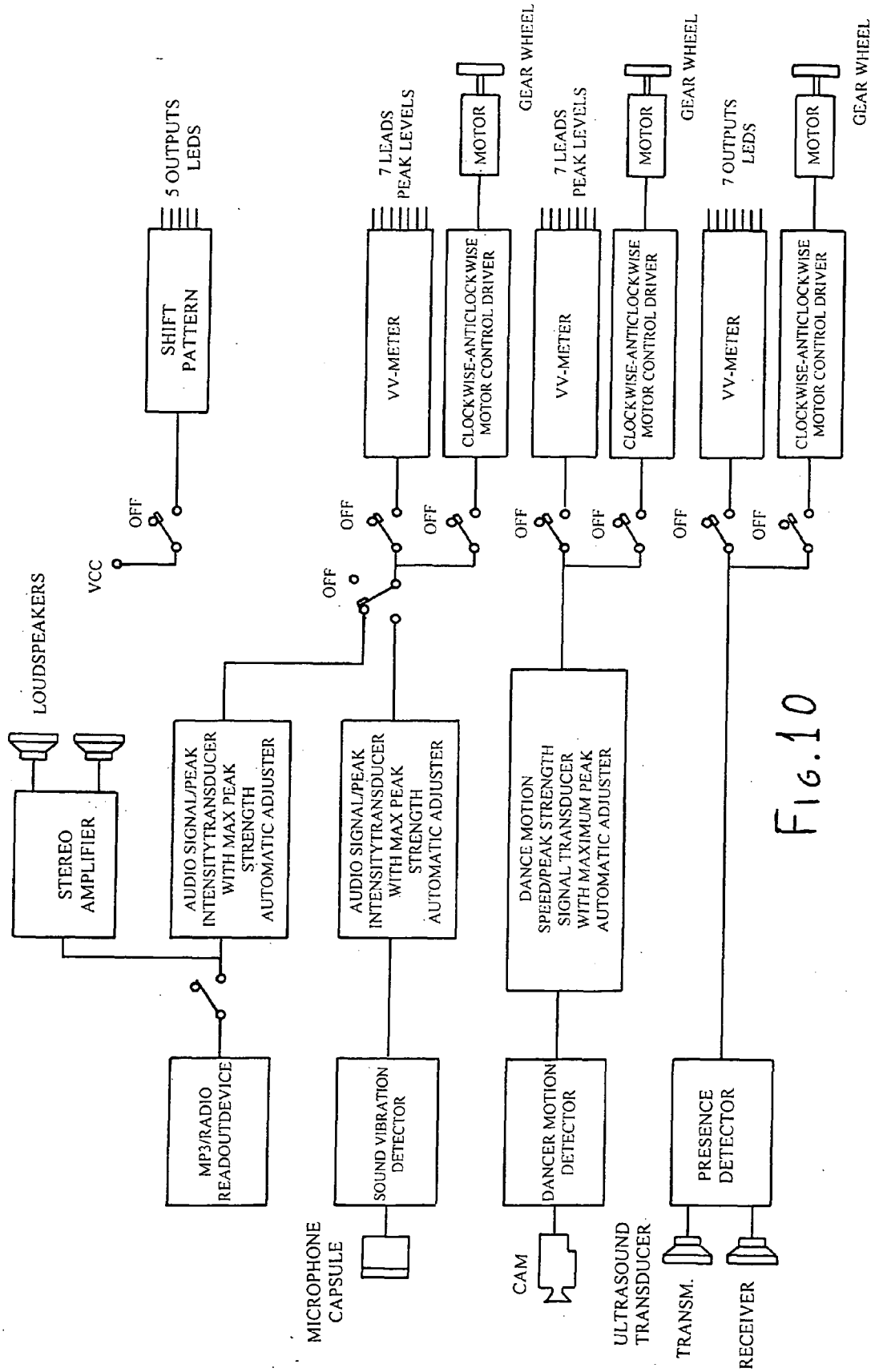


Fig.10



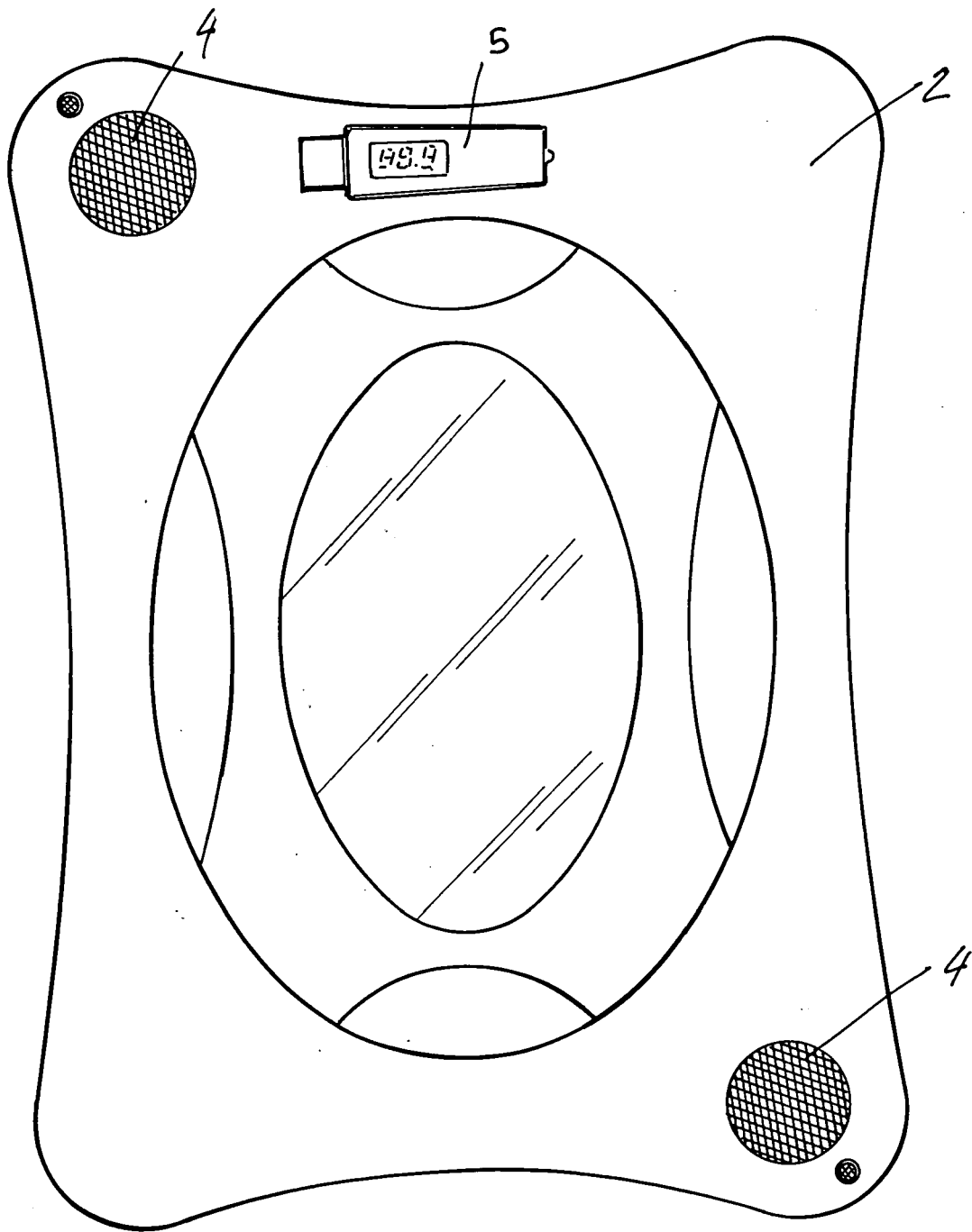


Fig. 11

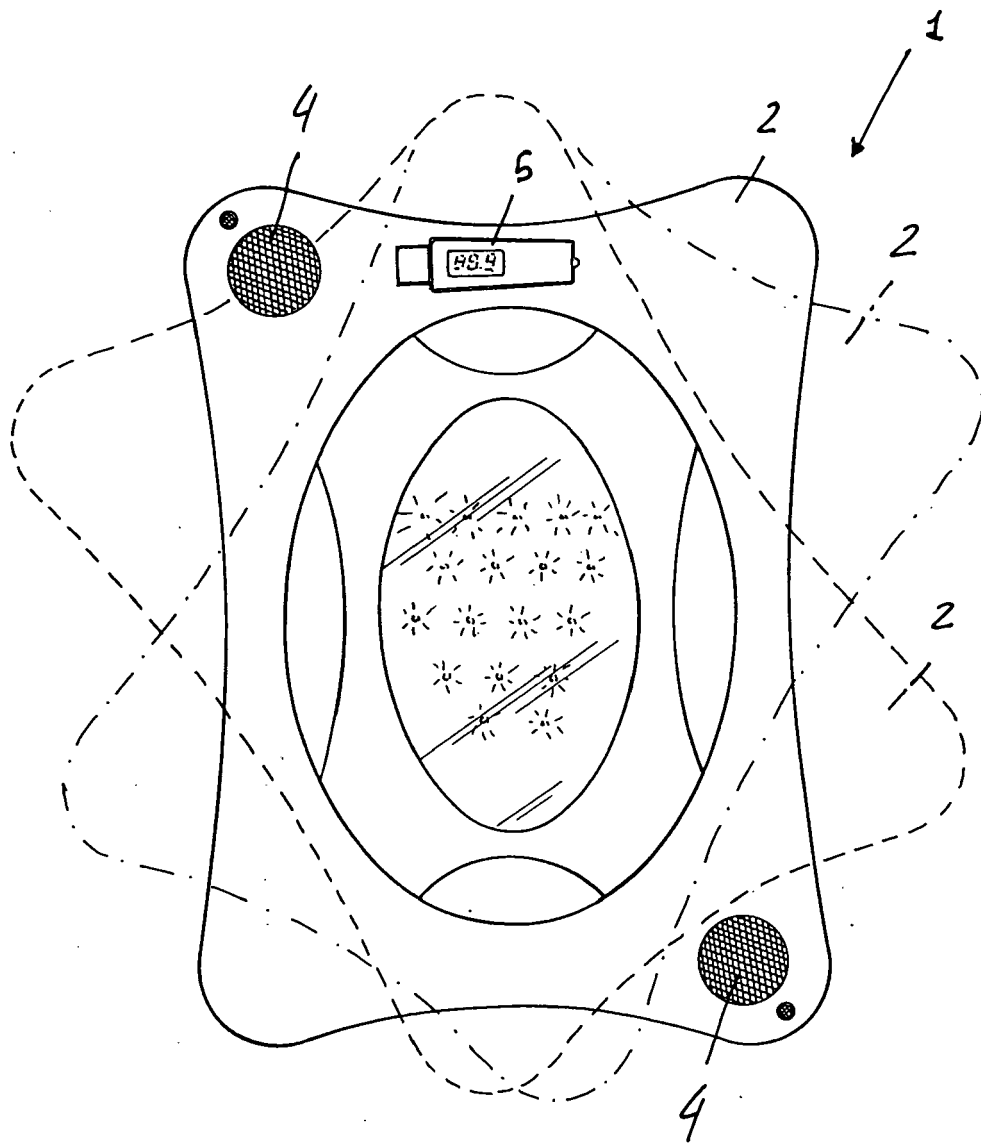


FIG. 12



FIG. 13

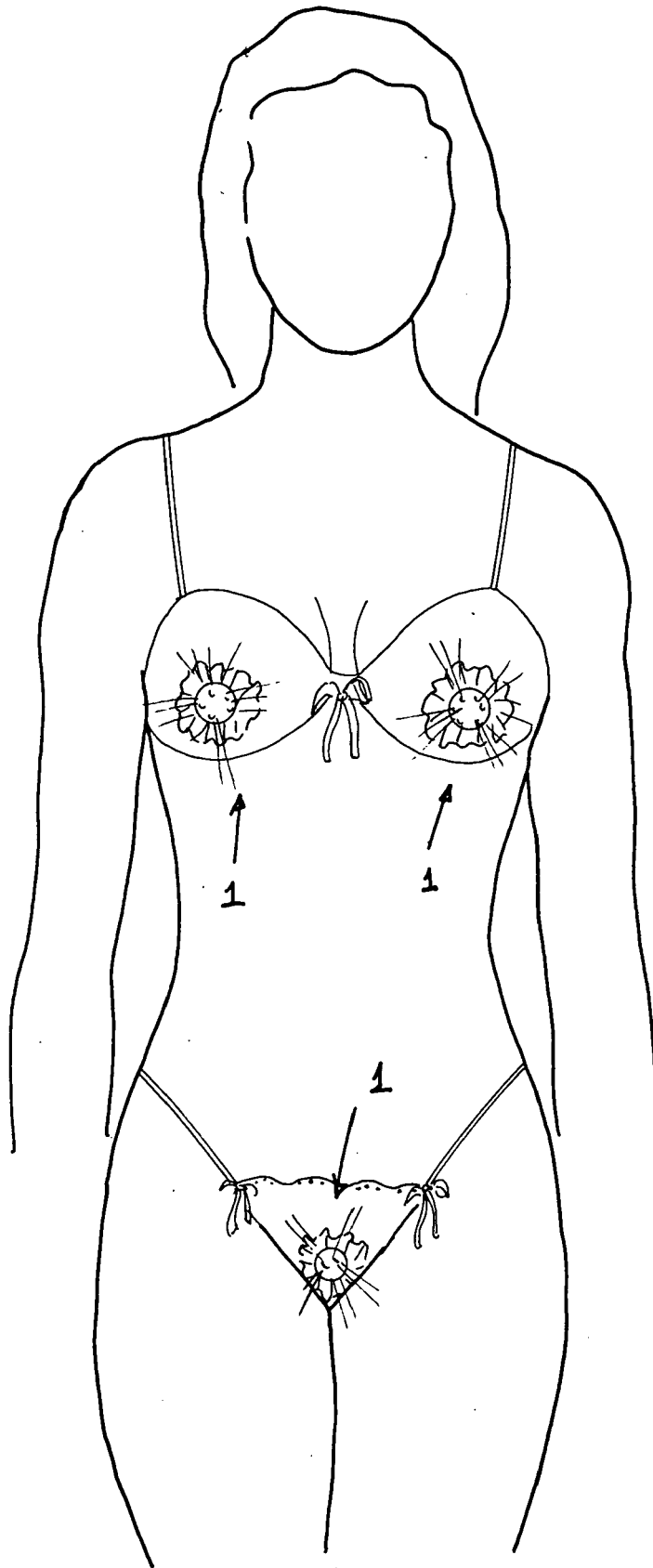


FIG. 14

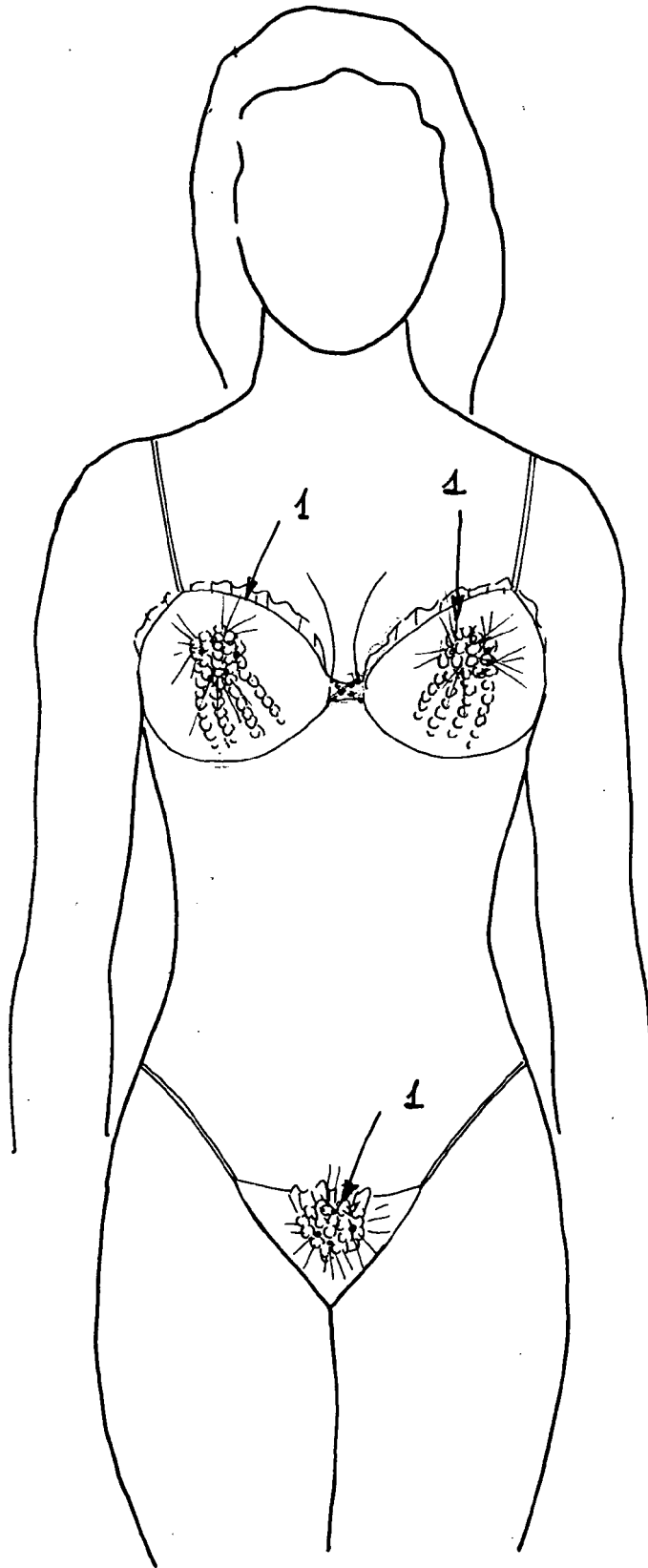


FIG. 15



| DOCUMENTS CONSIDERED TO BE RELEVANT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                             |                                                        |                                                          |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|----------------------------------------------------------|
| Category                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Citation of document with indication, where appropriate, of relevant passages                               | Relevant to claim                                      | CLASSIFICATION OF THE APPLICATION (IPC)                  |
| X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | GB 1 328 419 A (CHIYODA KK)<br>30 August 1973 (1973-08-30)                                                  | 1,3,5,6,<br>13,22,<br>23,31,32                         | INV.<br>A44C15/00<br>G09F27/00<br>G09F21/02<br>A41D27/08 |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | * page 2, line 33 - page 4, line 110;<br>figures<br>1A,1B,2A-2F,3A-3C,4-6,7A,7B,8A,8B,9,10,11A<br>-11F,12 * | 2,4,<br>7-12,<br>14-21,<br>24-30                       |                                                          |
| X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | -----<br>US 2004/231360 A1 (LAGARDERE LAETITIA)<br>25 November 2004 (2004-11-25)                            | 31                                                     |                                                          |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | * page 2, paragraph 30 - page 3, paragraph<br>39; figures 1A,1B,2A,2B *                                     | 1-30,32                                                |                                                          |
| X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | -----<br>US 5 455 749 A (FERBER ET AL)<br>3 October 1995 (1995-10-03)                                       | 31                                                     |                                                          |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | * column 5, line 64 - column 9, line 10;<br>figures 1-7 *                                                   | 1-30,32                                                |                                                          |
| X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | -----<br>US 2001/043164 A1 (THAGARD GREGORY B ET<br>AL) 22 November 2001 (2001-11-22)                       | 31                                                     |                                                          |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | * page 1, paragraph 24 - page 3, paragraph<br>47; figures 1-10 *                                            | 1-30,32                                                | TECHNICAL FIELDS<br>SEARCHED (IPC)                       |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | -----<br>EP 1 327 395 A (SCINTILLATE LIMITED)<br>16 July 2003 (2003-07-16)                                  | 1-32                                                   | A44C<br>G09F<br>A41D                                     |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | * column 13, paragraph 59 - column 21,<br>paragraph 99; figures 1-9 *                                       |                                                        |                                                          |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | -----<br>WO 92/12508 A (DISPLAY ENTERPRISES PTY.<br>LTD) 23 July 1992 (1992-07-23)                          | 1-32                                                   |                                                          |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | * page 7, line 19 - page 26, line 27;<br>figures 1-28 *                                                     |                                                        |                                                          |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | -----<br>US 6 659 617 B1 (MICHAEL PETER)<br>9 December 2003 (2003-12-09)                                    | 1-32                                                   |                                                          |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | * column 4, line 59 - column 8, line 47;<br>figures 1a,1b,2,3,4a,4b *                                       |                                                        |                                                          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | -----<br>-/-                                                                                                |                                                        |                                                          |
| The present search report has been drawn up for all claims                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                             |                                                        |                                                          |
| Place of search<br><b>Munich</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                             | Date of completion of the search<br><b>12 May 2006</b> | Examiner<br><b>Lendfers, P</b>                           |
| CATEGORY OF CITED DOCUMENTS<br>X : particularly relevant if taken alone<br>Y : particularly relevant if combined with another document of the same category<br>A : technological background<br>O : non-written disclosure<br>P : intermediate document<br>T : theory or principle underlying the invention<br>E : earlier patent document, but published on, or after the filing date<br>D : document cited in the application<br>L : document cited for other reasons<br>& : member of the same patent family, corresponding document |                                                                                                             |                                                        |                                                          |

2

EPO FORM 1503 03.82 (P04C01)



European Patent  
Office

# EUROPEAN SEARCH REPORT

Application Number  
EP 06 00 2059

| DOCUMENTS CONSIDERED TO BE RELEVANT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                           |                                                        |                                         |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|-----------------------------------------|
| Category                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Citation of document with indication, where appropriate, of relevant passages                                                                                             | Relevant to claim                                      | CLASSIFICATION OF THE APPLICATION (IPC) |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | US 5 201 578 A (WESTMOLAND ET AL)<br>13 April 1993 (1993-04-13)<br>* column 3, line 4 - column 7, line 14;<br>figures 1-8,8A *                                            | 1-32                                                   |                                         |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | US 2003/213045 A1 (FUENTES RICARDO<br>INDALECIO) 20 November 2003 (2003-11-20)<br>* page 2, paragraph 37 - page 4, paragraph<br>55; figures 1,2A,2B,3A-3C,4A-4K,5A-5E,6 * | 1-32                                                   |                                         |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | US 5 113 325 A (EISENBRAUN ET AL)<br>12 May 1992 (1992-05-12)<br>* column 2, line 44 - column 4, line 26;<br>figures 1-6 *                                                | 1-32                                                   |                                         |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | US 4 823 240 A (SHENKER ET AL)<br>18 April 1989 (1989-04-18)<br>* column 3, line 7 - column 4, line 44;<br>figures 1-4 *                                                  | 1-32                                                   |                                         |
| The present search report has been drawn up for all claims                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                           |                                                        | TECHNICAL FIELDS<br>SEARCHED (IPC)      |
| Place of search<br><b>Munich</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                           | Date of completion of the search<br><b>12 May 2006</b> | Examiner<br><b>Lendfers, P</b>          |
| <p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone<br/>Y : particularly relevant if combined with another document of the same category<br/>A : technological background<br/>O : non-written disclosure<br/>P : intermediate document</p> <p>T : theory or principle underlying the invention<br/>E : earlier patent document, but published on, or after the filing date<br/>D : document cited in the application<br/>L : document cited for other reasons</p> <p>&amp; : member of the same patent family, corresponding document</p> |                                                                                                                                                                           |                                                        |                                         |

2  
EPO FORM 1503 03/02 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 06 00 2059

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on  
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

12-05-2006

| Patent document<br>cited in search report |    | Publication<br>date | Patent family<br>member(s) | Publication<br>date |
|-------------------------------------------|----|---------------------|----------------------------|---------------------|
| GB 1328419                                | A  | 30-08-1973          | NONE                       |                     |
| US 2004231360                             | A1 | 25-11-2004          | FR 2810856 A1              | 04-01-2002          |
| US 5455749                                | A  | 03-10-1995          | RU 2141074 C1              | 10-11-1999          |
| US 2001043164                             | A1 | 22-11-2001          | JP 2001032105 A            | 06-02-2001          |
| EP 1327395                                | A  | 16-07-2003          | GB 2383939 A               | 16-07-2003          |
|                                           |    |                     | US 2003167795 A1           | 11-09-2003          |
| WO 9212508                                | A  | 23-07-1992          | CA 2099986 A1              | 08-07-1992          |
|                                           |    |                     | DE 69226165 D1             | 13-08-1998          |
|                                           |    |                     | DE 69226165 T2             | 25-03-1999          |
|                                           |    |                     | EP 0566628 A1              | 27-10-1993          |
|                                           |    |                     | JP 6504140 T               | 12-05-1994          |
| US 6659617                                | B1 | 09-12-2003          | AU 4595700 A               | 05-12-2000          |
|                                           |    |                     | EP 1176886 A1              | 06-02-2002          |
|                                           |    |                     | WO 0069304 A1              | 23-11-2000          |
| US 5201578                                | A  | 13-04-1993          | CA 2090188 A1              | 24-08-1994          |
|                                           |    |                     | JP 6205702 A               | 26-07-1994          |
|                                           |    |                     | WO 9418495 A1              | 18-08-1994          |
| US 2003213045                             | A1 | 20-11-2003          | NONE                       |                     |
| US 5113325                                | A  | 12-05-1992          | NONE                       |                     |
| US 4823240                                | A  | 18-04-1989          | NONE                       |                     |