(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 862 727 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
05.12.2007 Bulletin 2007/49

(51) Int Cl.:
F21S 8/00 *(2006.01)* ***F21L 13/04*** *(2006.01)*
F21L 4/02 *(2006.01)*

(21) Application number: **06252878.1**

(22) Date of filing: **02.06.2006**

(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

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(54) Table lantern

(57) A lantern comprises a housing (1) having a longitudinal axis, means (2,5) to support the lantern with its axis substantially vertical, a first light source (8) adapted to provide reflected illumination to a region surrounding the lantern, and a second light source (9) adapted to provide a beam of light directed substantially radially of, and inclined obliquely to, the longitudinal axis of the lantern housing (1). The lantern further includes an alternator (15) operable by turning a winding handle (11) to charge an internal battery (16) which selectively supplies power to the light sources.

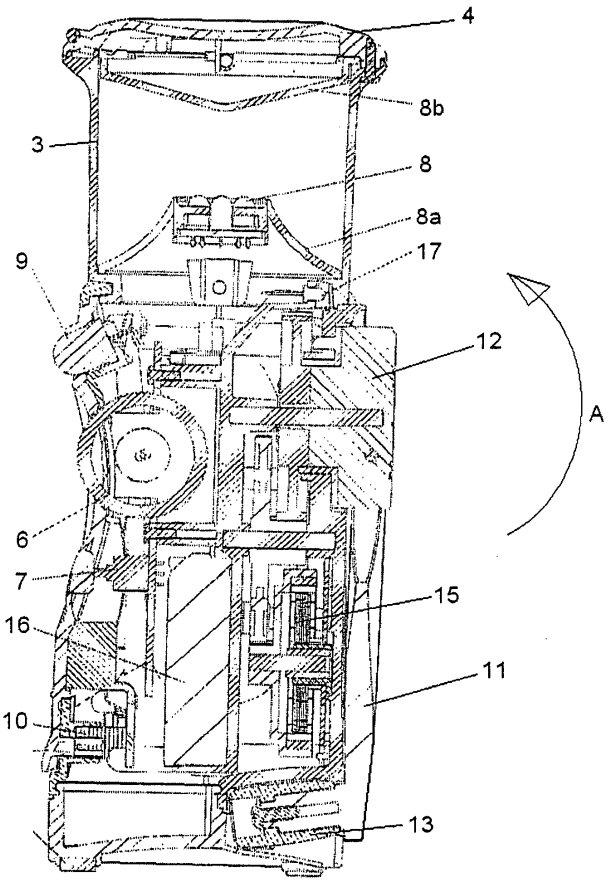

Fig 6

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Description

[0001] The present invention relates to lanterns, and is particularly concerned with a battery-operated rechargeable lantern capable both of area illumination and task lighting.

[0002] A first aspect of the present invention provides a lantern comprising a housing having a longitudinal axis, means to support the lantern with its axis substantially vertical, a first light source adapted to provide reflected illumination to a region surrounding the lantern, and a second light source adapted to provide a beam of light directed substantially radially of, and inclined obliquely to, the longitudinal axis of the lantern housing. The second light source, when activated, provides task lighting to an area of, for example, a tabletop on which the lantern is standing.

[0003] The lantern is preferably rechargeable by means of a built-in manually-operable alternator, adapted to provide charging current to a battery which powers the light sources.

[0004] An embodiment of the present invention will now be described in detail, by way of example only, with reference to the accompanying drawings, in which:

Figure 1 is a schematic diagram of the functional elements of a lantern according to the invention;

Figure 2 is a front view of the lantern of the present invention;

Figure 3 is a side view of the lantern, from the right as seen in Figure 2;

Figure 4 is a rear view of the lantern, with its winding handle in the stowed position;

Figure 5 is a rear perspective view from above of the lantern;

Figure 6 is a sectional view of the lantern in the plane VI-VI of Figure 2; and

Figure 7 is a view showing the winding handle in operation.

[0005] The lantern of the present invention comprises a substantially cylindrical housing 1, provided at one end with feet 2 so that the lantern may stand upright. At the other end of the housing 1 is a substantially cylindrical lens 3 for emitting light in the radial directions with respect to the cylindrical housing 1. At the end of the lantern opposite the feet 2 is an end cap 4, formed with a pivoting hanging loop 5. The hanging loop 5 allows the lantern to be suspended, maintaining substantially vertical alignment of the housing axis.

[0006] On the front face of the housing 1, there is provided a thumbwheel switch 6 and a button switch 7.

[0007] The thumbwheel switch 6 controls an array of light sources 8 (seen in Figure 6), positioned behind the lens 3. The light sources 8 are mounted at the upper end of a frustoconical reflector 8a, and are arranged to direct light axially away from the housing 1 towards a second reflector 8b mounted below, and facing away from, the end cap 4. The light from the source 8 is reflected by the reflectors 8b and 8a so as to be directed through the lens 3 to provide area illumination surrounding the lantern. Optionally, the lens 3 may be a diffuser.

[0008] The button switch 7 controls a second light source 9, positioned on the front of the lantern and angled obliquely downwardly as seen in the Figures. When the lantern is standing on a table, the second light source 9 provides bright illumination to an area of the table close to the base of the housing 1 for task lighting. When the lantern is hand-held, for example while walking about, the second light source 9 may serve as a flashlight.

[0009] Below the button switch 7 is provided a charging socket 10.

[0010] A winding handle 11 is provided at the rear of the housing 1, the winding handle 11 being pivotally mounted to a hub 12. In Figures 3 to 6, the winding handle 11 is seen in its stowed position. In this position, the winding handle 11 extends longitudinally of the housing 1, and a grip knob 13 at the end of the winding handle 11 is received within a recess 14 adjacent the lower end of the housing 1 (as seen in the Figures).

[0011] The winding handle 11 is operated by pivoting the handle in the direction of arrow A of Figure 6, to the position shown in Figure 7. The grip knob 13 may then be held, and the winding handle 11 and hub 12 rotated relative to the housing 1 about an axis which extends radially with respect to the housing.

[0012] The hub 12 is connected via a drive shaft and a gear train to an alternator 15 mounted within the housing 1. The gear train and alternator are substantially as described in the applicant's published European patent applications numbered EP 1 451 917 and EP 1 623 493, and produces an output voltage which increases in relation to the speed at which the winding handle is turned.

[0013] Referring now to Figure 1, there is seen a schematic illustration of the electrical connections between the various components of the lantern. A battery 16, mounted within the housing 1 adjacent the lower end of the housing, is electrically connected to the alternator 15. The alternator is connected to a diode bridge circuit, which rectifies the AC current produced by the alternator into a DC charging current which is supplied to the battery. A proportion of the alternator output is rectified and smoothed, and is fed to a Zener diode, which illuminates an LED (light-emitting diode) indicator 17 when the alternator output voltage exceeds a predetermined level. This voltage level is set at the minimum level required for charging the battery 16. Thus, when the alternator is operated by turning the winding handle 11, the user observes the indicator LED 17 to ensure that sufficient voltage is being produced to charge the battery. If the LED

indicator extinguishes, the user must turn the winding handle faster.

[0014] The battery 16 may also be charged by connecting an external voltage source to the charging socket 10.

[0015] The battery is connected to provide voltage to the thumbwheel switch 6 and to the button switch 7. The button switch 7 controls the supply of power to the second light source 9, which in this embodiment consists of an LED. Preferably, the LED 9 is driven via a current mirror circuit which prevents the current in the LED from rising excessively when the battery voltage is very high.

[0016] The thumbwheel switch 6 controls an integrated circuit (not shown) which generates a square wave output, which is fed to the light source 8. The light source 8 is preferably an array of LEDs, most preferably seven LEDs arranged in a circular array coaxial with the housing 1. The thumbwheel switch 6 controls an input voltage to the integrated circuit which in turn controls the duty cycle of the square wave output. As the input voltage is increased by turning the thumbwheel, the mark/space ratio of the square wave is altered so that the "on" part of the cycle is lengthened and the "off" part of the cycle is shortened. The effect is to increase the perceived brightness of the illumination provided by the LEDs 8.

[0017] A low voltage cutout circuit is also provided, so that when the battery voltage is low, i.e. when the battery is discharged, the low voltage cutout circuit prevents further power from being drawn from the battery and thus avoids battery damage. In the preferred embodiment, the low voltage cutout circuit detects the battery voltage, and prevents operation of the square wave generator if the battery voltage is below the predetermined level.

[0018] In use, the lantern battery 16 is first charged, either by connecting a voltage source to the external charging socket 10, or by turning the winding handle 11. When the battery is charged, the user has a choice of operating modes for the lantern.

[0019] In a first mode, the lantern may be stood on a tabletop, or suspended from its hanging loop 5, and thumbwheel switch 6 rotated to illuminate the light source 8. The lantern will then provide area illumination to the surrounding space, the intensity of the illumination being controlled by rotation of the thumbwheel switch 6.

[0020] In a second mode, for example to provide task light to a smaller area, for example for reading, the button switch 7 is operated and the second light source 9 illuminates. The lantern may then be placed on a tabletop, positioned so that the light from the second light source 9 is directed at the task area of the tabletop. Alternatively, the lantern may be hand-held, the second light source 9 serving as a flashlight.

[0021] If the user wishes, the lantern may be operated simultaneously in both the first and the second modes.

[0022] When the battery voltage falls to a predetermined level, after a current is drained from the battery by use of the light sources, then the low voltage cutout circuit 18 operates to turn off the current supply to the first light source. The lantern may then be reactivated by recharging the battery, either by turning the winding handle 11 or by connecting a voltage source to the charging socket 10.

[0023] As an alternative to the use of LEDs as the light sources, conventional filament bulbs may be used in order to give a "softer" light spectrum. This will, however, consume more current and therefore shorten the time for which the lantern will run between charging operations.

Claims

1. A lantern comprising a housing (1) having a longitudinal axis, means (2,5) to support the lantern with its axis substantially vertical, a first light source (8) adapted to provide reflected illumination to a region surrounding the lantern, and a second light source (9) adapted to provide a beam of light directed substantially radially of, and inclined obliquely to, the longitudinal axis of the lantern housing (1).

2. A lantern according to claim 1, wherein the first and second light sources (8, 9) are electrically operated, and wherein the housing contains:

   a rechargeable battery (16) arranged to selectively provide electrical power to the first and second light sources; and
   a manually operable alternator (15) and rectifier arranged to provide charging power to the battery.

3. A lantern according to claim 2, wherein electrical power is provided from the battery to the first light source via power supply circuitry including a switching means (6) adapted to control the intensity of illumination provided by the first light source (8).

4. A lantern according to claim 3, wherein the power supply circuitry for the first light source supplies a square wave current to the first light source, and wherein the intensity of illumination of the first light source is controlled by varying the duty cycle of the square wave current.

5. A lantern according to any preceding claim, wherein electrical power is provided from the battery to the second light source via switching means (7) having only "on" or "off" states.

6. A lantern according to any preceding claim, wherein the first and second light sources (8, 9) comprise LEDs.

7. A lantern according to any preceding claim, wherein the housing is substantially cylindrical and has at one end a base (2) adapted to engage a horizontal sur-

face and support the lantern housing with its longitudinal axis substantially vertical.

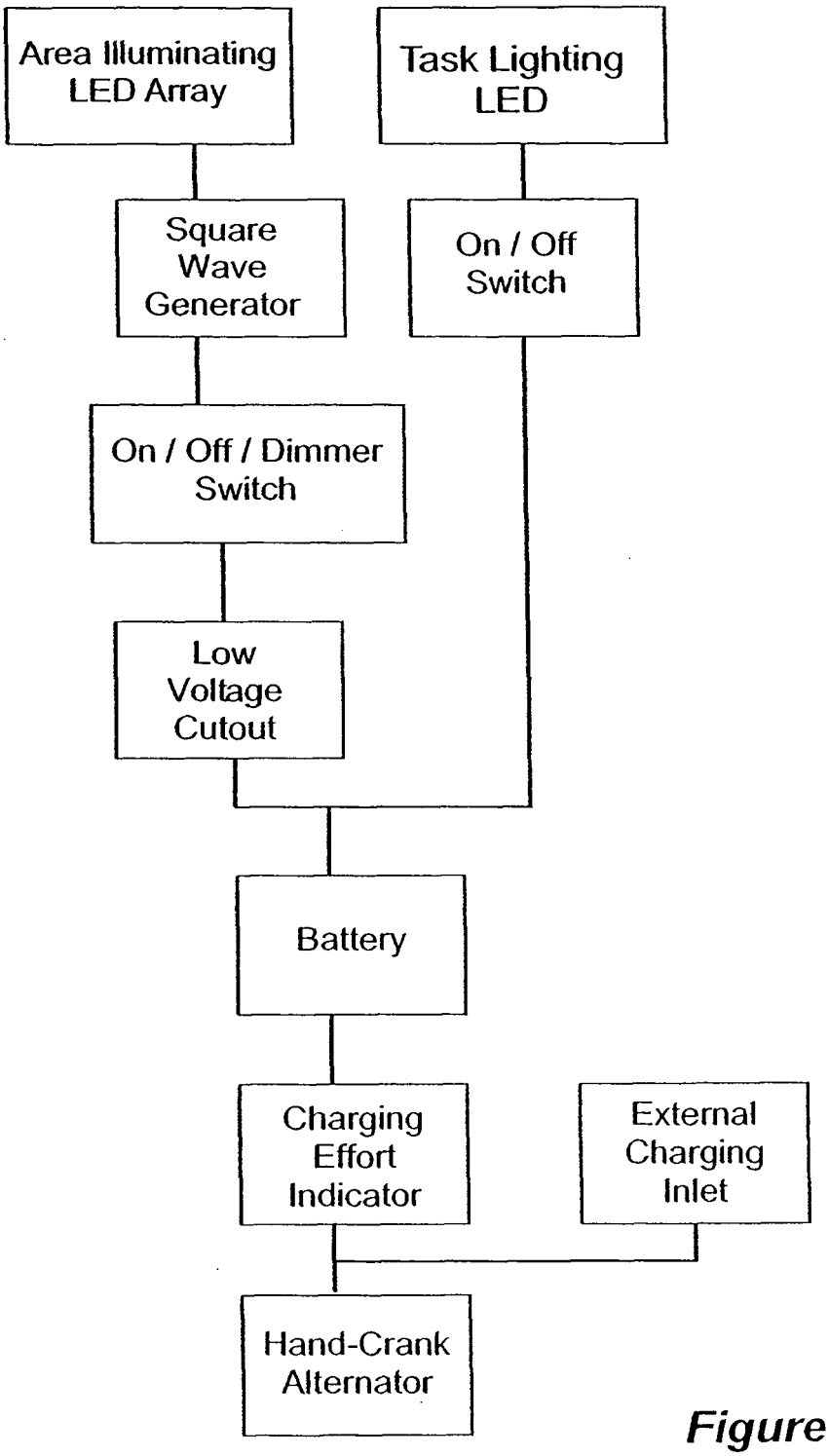

Area Illuminating LED Array
Task Lighting LED
Square Wave Generator
On / Off Switch
On / Off / Dimmer Switch
Low Voltage Cutout
Battery
Charging Effort Indicator
External Charging Inlet
Hand-Crank Alternator

Figure 1

Fig 3

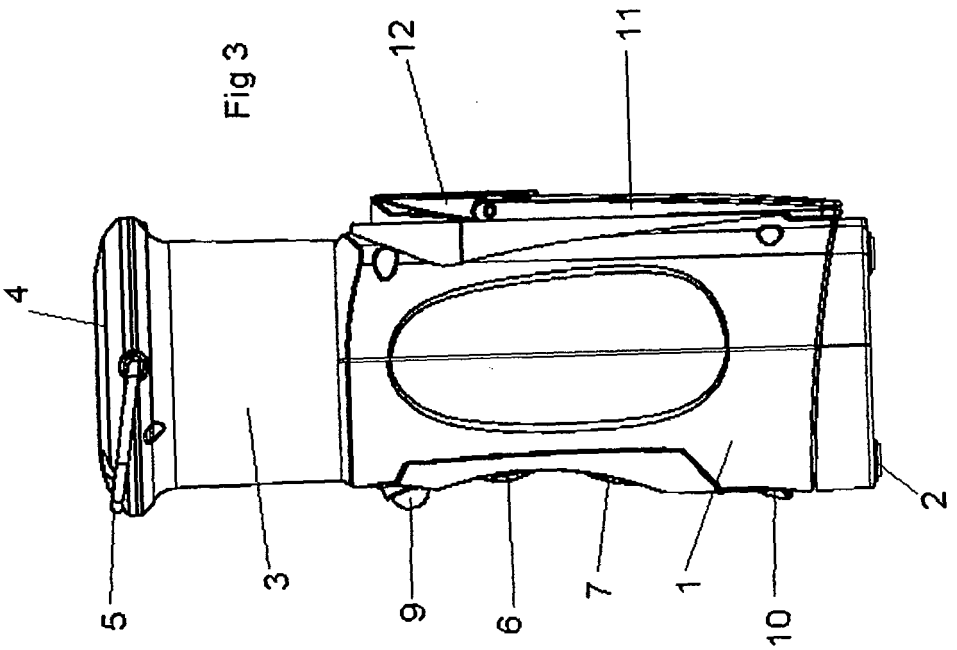


Fig 2

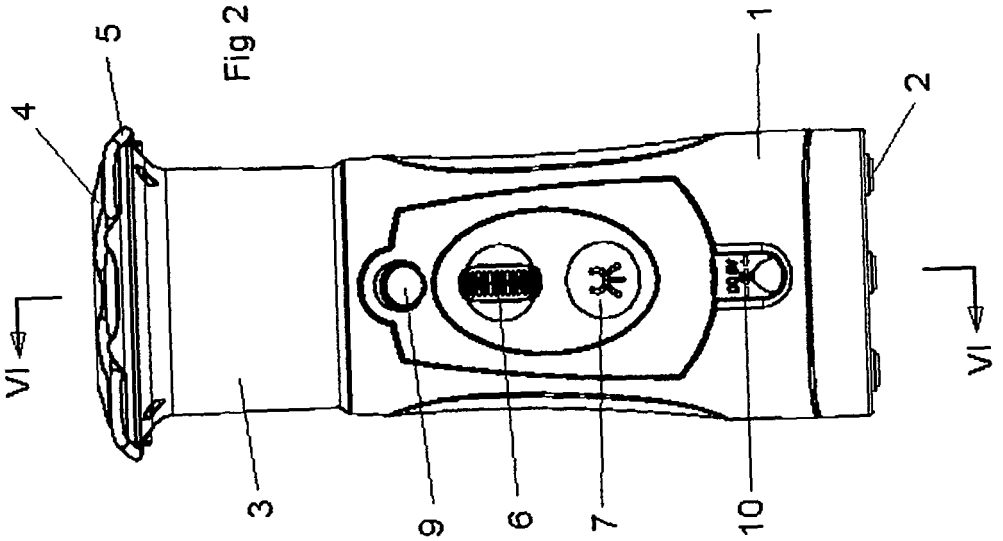


Fig 5

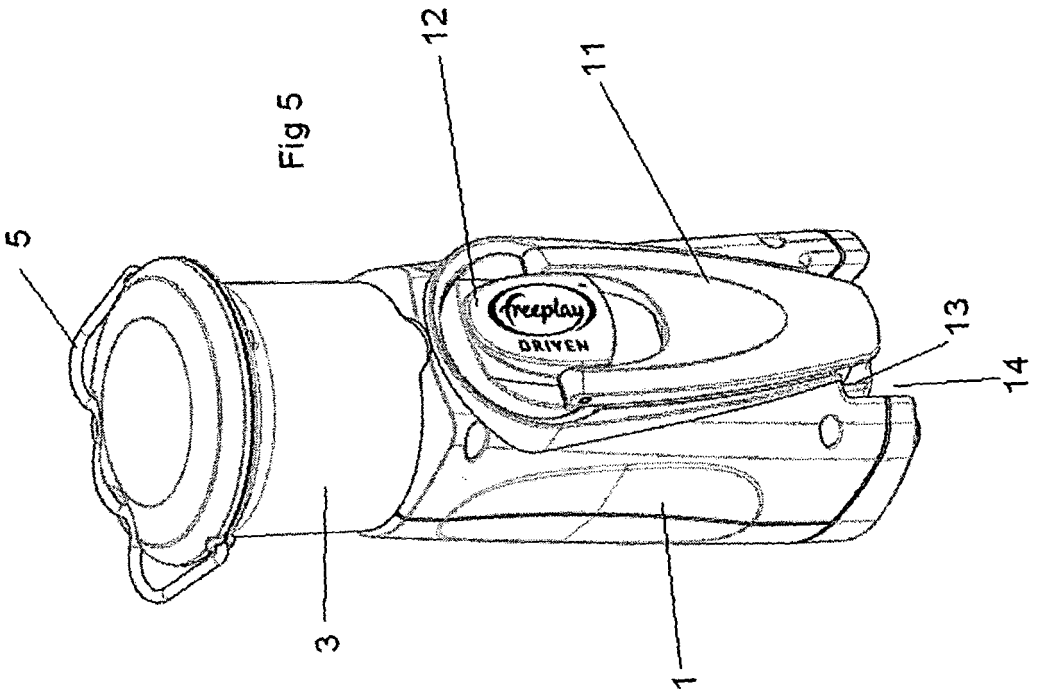


Fig 4

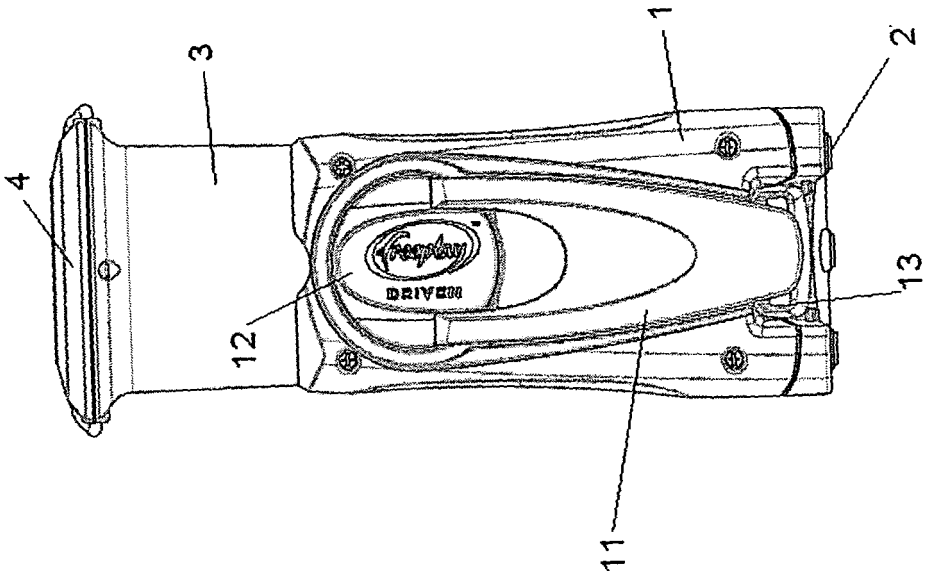


Fig 6

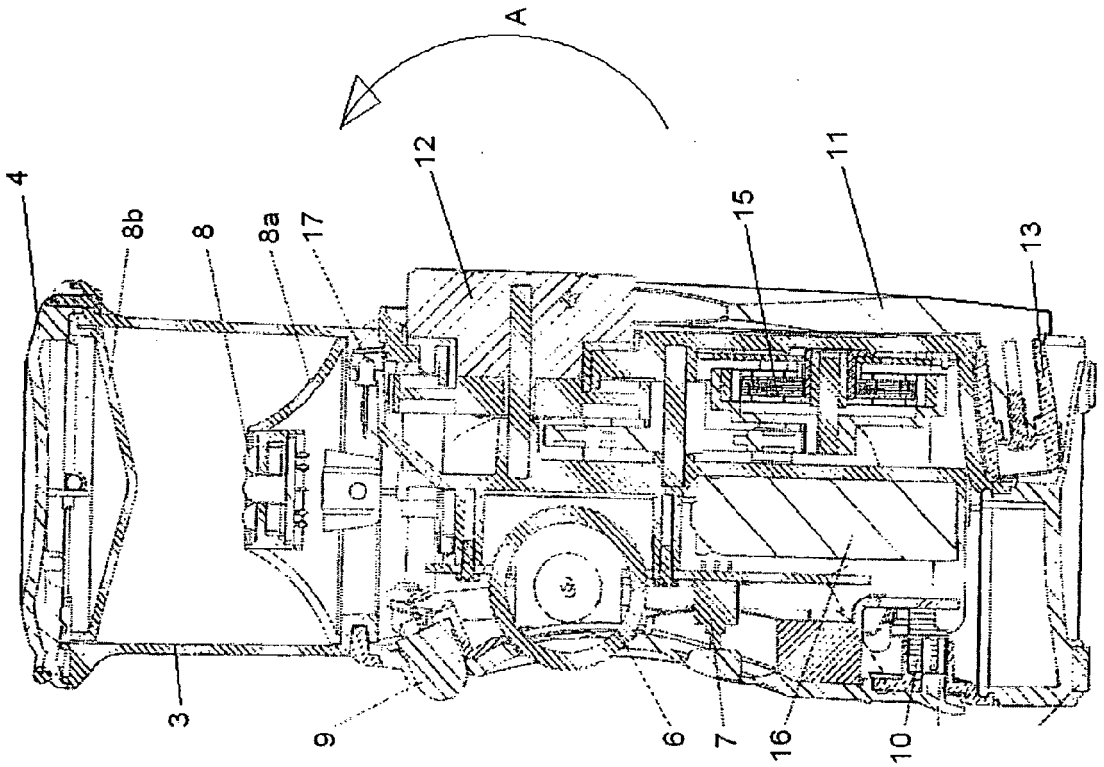
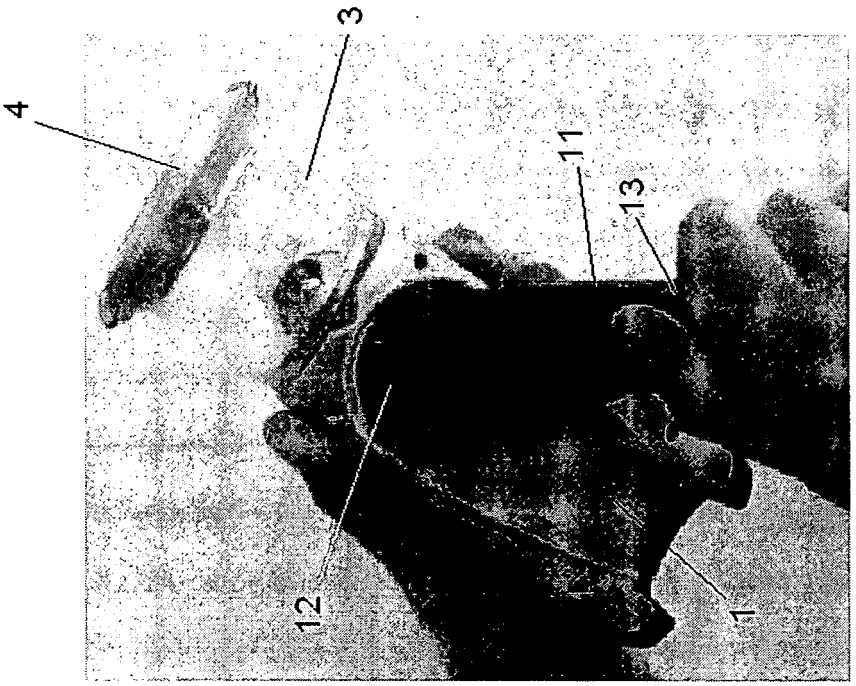


Fig 7



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EUROPEAN SEARCH REPORT

Application Number
EP 06 25 2878

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 Y	WO 2005/088187 A (SEOK, CHAN-BOK) 22 September 2005 (2005-09-22) * paragraph [0008] - paragraph [0035]; figures 1-4 *	1,5-7 2-4	INV. F21S8/00 F21L13/04 F21L4/02
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TECHNICAL FIELDS SEARCHED (IPC)

F21S
F21L

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	28 September 2006	Arboreanu, Antoniu

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28-09-2006

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