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Application No. 16 190 750.6 - 1757	Ref. B19196EP	Date 03.11.2017
Applicant Shenzhen Ningrui Electronical Technology Co., Ltd.		

## Communication under Rule 71(3) EPC

### 1. Intention to grant

You are informed that the examining division intends to grant a European patent on the basis of the above application, with the text and drawings and the related bibliographic data as indicated below.

A copy of the relevant documents is enclosed.

#### 1.1 In the text for the Contracting States:

AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT  
RO RS SE SI SK SM TR

#### Description, Pages

1-7 as originally filed

#### Claims, Numbers

1-10 as originally filed

#### Drawings, Sheets

1/6-6/6 as originally filed

#### With the following amendments to the above-mentioned documents proposed by the division

Description, Pages 1, 7

Claims, Numbers 3

#### Comments

## DESCRIPTION

Page 1: Mention of relevant prior art in the description (Rule 42(1) EPC)

Page 1: Description adapted to the claims (Art. 84 EPC)

Page 7: Description adapted to the claims (Art. 84 EPC), embodiments 7 and 8 are not included in the scope of claim 1

Page 7: see Guidelines F-IV.4.4.

## CLAIMS

Page 8, Claim 3: Error(s) in spelling, grammar, typography corrected, claim 3 refers to "the milky films", while the milky films are only introduced in claim 2.

## 1.2 Bibliographic data

The title of the invention in the three official languages of the European Patent Office, the international patent classification, the designated contracting states, the registered name(s) of the applicant(s) and the other bibliographic data are shown on **EPO Form 2056** (enclosed).

## 2. Invitation

You are invited, **within a non-extendable period of four months** of notification of this communication,

2.1 to EITHER approve the text communicated above and verify the bibliographic data (Rule 71(5) EPC)

(1) by filing a translation of the claim(s) in the other two official languages of the EPO

	Fee code	EUR
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(2a) by paying the fee for grant including the fee for publication:  
minus any amount already paid (Rule 71a(5) EPC):

<b>007</b>	925.00
	0.00

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Total amount:	925.00
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(3) by paying additional claims fees under Rule 71(4) EPC;  
number of claims fees payable: 0  
minus any amount already paid (Rule 71a(5) EPC):

<b>016</b>	0.00
	0.00

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Total amount:	0.00
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**Important:** If the translations of the claims and fees have already been filed and paid respectively in reply to a previous communication under Rule 71(3) EPC, e.g. in the case of resumption of examination after approval (see Guidelines C-V, 6), **agreement as to the text to be granted** (Rule 71a(1) EPC) must be expressed within the same time limit (e.g. by approving the text and verifying the bibliographic data, by confirming that grant proceedings can go ahead with the documents on file and/or by stating which translations of the claims already on file are to be used).

Note 1: See "Important notes concerning fee payments" below.

Note 2: Any overpaid "minus" amounts will be refunded when the decision to grant (EPO Form 2006A) has been issued.

Note 3: For the calculation of the grant fee under Article 2(2), No. 7, RFees (old fee structure), the number of pages is determined on the basis of a clean copy of the application documents, in which text deleted as a result of any amendments by the examining division is not shown. Such clean copy is made available via on-line file inspection only.

**2.2 OR, in the case of disapproval, to request reasoned amendments or corrections to the text communicated above or keep to the latest text submitted by you (Rule 71(6) EPC).**

In this case the translations of the claims and fee payments mentioned under point 2.1 above are NOT due.

The terms "amendment(s)" and "correction(s)" refer only to amendments or corrections of the application documents and not of other documents (e.g. bibliographic data, the designation of the inventor, etc.).

If filing amendments, you must identify them and indicate the basis for them in the application as filed. Failure to meet either requirement may lead to a communication from the examining division requesting that you correct this deficiency (Rule 137(4) EPC).

**2.3 Bibliographic data**

Where you request a change or correction of bibliographic data in response to the Rule 71(3) communication, this will **not** cause the sending of a further communication under Rule 71(3) EPC. You will still have to pay the fees and file translations in reply to the Rule 71(3) communication in the case of 2.1 above, unless you also file a reasoned request for amendments or corrections in response to the Rule 71(3) communication (see case 2.2 above).

**3. Loss of rights**

If neither of the two possible actions above (see points 2.1 or 2.2) is performed in due time, the European patent application will be deemed to be withdrawn (Rule 71(7) EPC).

**4. Further procedure**

**4.1 In the case of point 2.1 above**

- 4.1.1** The decision to grant the European patent will be issued, and the **mention of the grant** of the patent will be published in the European Patent Bulletin, if the requirements concerning the translation of the claims and the payment of all fees are fulfilled and there is agreement as to the text to be granted (Rule 71a(1) EPC).

**Note on payment of the renewal fee:**

If a renewal fee becomes due before the next possible date for publication of the mention of the grant of the European patent, publication will be effected only after the renewal fee and any additional fee have been paid (Rule 71a(4) EPC).

Under Article 86(2) EPC, the obligation to pay renewal fees to the European Patent Office terminates with the payment of the renewal fee due in respect of the year in which the mention of the grant of the European patent is published.

**Note on payment of the designation fee(s):**

If the designation fee(s) become(s) due after the communication under Rule 71(3) EPC, the mention of the grant of the European patent will not be published until these fees have been paid (Rule 71a(3) EPC).

- 4.1.2** After publication, the **European patent specification** can be downloaded free of charge from the EPO publication server <https://data.epo.org/publication-server> or ordered from the Vienna sub-office upon payment of a fee (OJ EPO 2005, 126).

**4.1.3 Filing of translations in the contracting states**

As regards translation requirements prescribed by the contracting states under Article 65(1) EPC, please consult the website of the European Patent Office

[www.epo.org](http://www.epo.org) → Law & practice → Legal texts, National law relating to the EPC

[www.epo.org](http://www.epo.org) → Law & practice → All Legal texts → London Agreement

**In the case of a valid extension or validation**

As regards translation requirements prescribed by the extension or validation states, please consult the website of the European Patent Office

[www.epo.org](http://www.epo.org) → Law & practice → Legal texts, National law relating to the EPC

**Failure to supply a prescribed translation in a contracting state, or in an extension or validation state may result in the patent being deemed to be void *ab initio* in the state concerned (Art. 65(3) EPC).**

**4.2 In the case of 2.2 above**

If the present communication under Rule 71(3) EPC is based on an auxiliary request and, within the time limit, you maintain the main request or a higher ranking request which is not allowable, the application will be refused (Art. 97(2) EPC).

If the examining division gives its consent to the requested amendments or corrections, it will issue a new communication under Rule 71(3) EPC; otherwise, it shall resume the examination proceedings (Rule 71(6) EPC).

**5. Filing of a divisional application**

Any divisional application relating to this European patent application must be filed directly with the European Patent Office in Munich, The Hague or Berlin and will be in the language of the proceedings for the present application, or if the latter was not in an official language of the EPO, the divisional application may be filed in the language of the present application as filed (see Article 76(1) and Rule 36(2) EPC). Any such divisional application must be filed while the present application is still pending (Rule 36(1) EPC; Guidelines A-IV, 1.1.1).

**6. Important notes concerning fee payments**

**6.1** For all payments, please refer to the relevant **fee code(s)**.

**6.2 Automatic debiting procedure**

The fee for grant, including the fee for publication, and any additional claims fees due under Rule 71(4) EPC will be debited automatically on the date of filing of the translations of the claims, or on the last day of the period of this communication. However, if the designation fee(s) become(s) due as set out in Rule 71a(3) EPC and/or a renewal fee becomes due as set out in Rule 71a(4) EPC, these should be paid separately by another permitted way of payment in order not to delay the publication of the mention of the grant. The same applies in these circumstances to the payment of extension and validation fees. For further details see the Arrangements for the automatic debiting procedure (AAD) and accompanying information from the EPO concerning the automatic debiting procedure (Annexes A.1 and A.2 to the Arrangements for deposit accounts (ADA) in Supplementary publication - OJ EPO 3/2015).

Note: If a waiver is expressed in response to a Rule 71(3) communication (see OJ EPO 2015, A52), the fee for grant, including the fee for publication/printing, and any additional claims fees will not be debited automatically. These fees must be paid separately by another means of payment allowed under the Rules relating to Fees.

**6.3 Important information relating to fee amounts**

Following any amendment to the Rules relating to Fees, the amount(s) mentioned in this communication may be different from the amount(s) **actually due on the date of payment**. The latest version of the Schedule of fees and expenses, published as a Supplement to the Official Journal of the EPO, is also available on the EPO website ([www.epo.org](http://www.epo.org)) and can be found under [www.epo.org/schedule-of-fees](http://www.epo.org/schedule-of-fees), which allows the viewing, downloading and searching for individual fee amounts, both current and previous.

Please note that procedural fees are usually adjusted every two years, on even years, with effect from 1 April.

**Examining Division:**

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Enclosures: Text intended for grant

EPO Form 2056

**Annex to EPO Form 2004, Communication pursuant to Rule 71(3) EPC**

Bibliographical data of European patent application No. 16 190 750.6

For the intended grant of the European patent, the bibliographical data are set out below, for information:

**Title of invention:** - ELEKTRONISCHE KERZE  
- ELECTRONIC CANDLE  
- BOUGIE ÉLECTRONIQUE

**Classification:** INV. F21S6/00 F21S10/04 ADD. F21Y115/10

**Date of filing:** 27.09.2016

**Priority claimed:** CN / 30.09.2015 / CNA201510642196

**Contracting States\***  
for which fees have  
been paid: AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU  
LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

**Extension States\***  
for which fees have  
been paid: BA ME

**Validation States\***  
for which fees have  
been paid: MA MD

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\*) If the time limit for the payment of designation fees according to Rule 39(1) EPC has not yet



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expired and the applicant has not withdrawn any designation, **all Contracting States/Extension States/Validation States** are currently still deemed to be designated. See also Rule 71a(3) EPC and, if applicable, the above Note to users of the automatic debiting procedure.

\*\* ) If two or more applicants have designated different Contracting States, this is indicated here.





1  
**ELECTRONIC CANDLE**

**Field of the Invention**

The present invention relates to the field of lighting appliances, and particularly  
5 relates to an electronic candle.

**Background of the Invention**

In daily life, candlelight is often used to decorate the atmosphere, but the traditional  
candle is not quite convenient, because the candle conventionally produces a  
10 high-temperature flame, which not only increases the concentration of carbon dioxide  
in air, but also has great potential safety hazards, the resource utilization rate is low  
and the requirements for energy conservation and environment friendliness are not  
met. If an electronic candle using a lamp as a luminous element is directly used, it is  
unreal and unsatisfactory in atmosphere decoration effect, thus influencing people's  
15 feelings.



Documents CN 203980132 U, WO 2015021066 A2 and US 2015109786 A1 disclose electronic  
candles of the prior art. ■ 2

**Summary of the Invention**

An object of the present invention is to design an electronic candle for solving the  
above problems.

20 A technical solution of the present invention for achieving the above object is an  
electronic 2 ■ candle according to claim 1, ■ 2

~~candle,~~ including a plastic wrapper and a white wax shell, wherein a spring  
is arranged inside the plastic wrapper and the white wax shell, an upright metal wire is  
arranged at the upper end of the spring, a metal ring is arranged at the lower end of the  
spring, the metal wire is sleeved with an included angle reflecting screen, a plurality  
25 of color flame projectors matched with the included angle reflecting screen are  
arranged on the plastic shell above the spring, a supporting rod with a concave point is  
arranged on the white wax shell below the spring, the supporting rod with the concave  
point transversely penetrates through the metal ring, a metal hook is arranged at the  
lower end of the metal ring, a soft iron sheet is connected to the metal hook, and a  
30 driver for driving the soft iron sheet to swing and an overall power supply for

supplying power to the driver and the color flame projectors are arranged below the soft iron sheet.

Preferably, the included angle reflecting screen is formed jointly by a plurality of milky films distributed on the same center line at equal angles, and a circular hole for  
5 sleeving on the metal wire is formed at the lower end of the center line.

Advantageously, the quantity of the plurality of color flame projectors is the same as that of the milky films, the plurality of color flame projectors are distributed on the same circumference at equal angles with the included angle reflecting screen as a center, and each color flame projector is located in a relationship of one-to-one  
10 correspondence with the included angle between two adjacent milky films.

Each color flame projector can be jointly composed of a support, color tubes arranged on the support, a color flame film and a convex lens.

The color tubes can be jointly composed of red, white and yellow LED tubes.

The driver can be composed of a circuit board and an electromagnetic coil fixed on  
15 the circuit board.

The overall power supply can be formed by connecting a power supply and a power switch in series.

Preferably, the power supply and the power switch are respectively electrically connected with the circuit board to form a closed circuit, and the circuit board is  
20 electrically connected with the color tubes.

Advantageously, the included angle between the two adjacent milky films of the included angle display screen is 0-120 degrees and corresponds to a flame projector.

The metal ring can be positioned within an area of the supporting rod where the concave point is located.

25 Each of the spring, the metal wire at the upper end of the spring, the metal ring at the lower end of the spring and the metal hook at the lower end of the metal ring can be formed by winding a steel wire.

According to the electronic candle manufactured by using the technical solution of the present invention, a color flame and the included angle reflector are caused to move  
30 up and down by electromagnetic pulse drive and spring disturbance, thus producing a

candlelight flickering decoration effect, bringing candlelight atmosphere and great flickering reality to the surroundings, meanwhile, solving the original problems of being not environment-friendly and unreal and furthest meeting the pursuit of people's life.

5

### **Brief Description of the Drawings**

- Fig. 1 is a structural schematic diagram of embodiment 1 of the present invention;  
Fig. 2 is a structural schematic diagram of an included angle reflecting screen in embodiment 1 of the present invention;
- 10 Fig. 3 is a structural schematic diagram of a color flame projector in embodiment 1 of the present invention;  
Fig. 4 is a structural schematic diagram of embodiment 2 of the present invention;  
Fig. 5 is a structural schematic diagram of a color flame projector in embodiment 3 of the present invention;
- 15 Fig. 6 is a structural schematic diagram of an included angle reflecting screen in embodiment 4 of the present invention;  
Fig. 7 is a structural schematic diagram of an included angle reflecting screen in embodiment 5 of the present invention;  
Fig. 8 is a structural schematic diagram of an included angle reflecting screen in  
20 embodiment 6 of the present invention;  
Fig. 9 is a structural schematic diagram of a driver part in embodiment 7 of the present invention;  
Fig. 10 is a structural schematic diagram of a driver part in embodiment 8 of the present invention.
- 25 Reference numerals: 1, plastic shell; 2, spring; 3, metal wire; 4, metal ring; 5, included angle reflecting screen; 6, color flame projector; 7, supporting rod with concave point; 8, soft iron sheet; 9, milky film; 10, circular hole; 11, support; 12, color tube; 13, color flame film; 14, convex lens; 15, circuit board; 16, electromagnetic coil; 17, power supply; 18, power switch; 19, metal hook; 20, long spring; 21, positioning column; 22,  
30 base; 23, linear spring.

### Detailed Description of the Embodiments

The embodiments of the present invention will be specifically described below in conjunction with the accompanying drawings.

#### 5 Embodiment 1

As shown in Figs. 1-3, an electronic candle includes a plastic wrapper and a white wax shell 1, a spring 2 is arranged inside the plastic wrapper and the white wax shell, an upright metal wire 3 is arranged at the upper end of the spring, a metal ring 4 is arranged at the lower end of the spring, the metal wire is sleeved with an included  
10 angle reflecting screen 5, three color flame projectors 6 matched with the included angle reflecting screen are arranged on the plastic shell above the spring, a supporting rod 7 with a concave point is arranged on the white wax shell below the spring, the supporting rod with the concave point transversely penetrates through the metal ring, the metal ring 4 is positioned within an area of the supporting rod where the concave  
15 point is located, a metal hook 19 is arranged at the lower end of the metal ring, a soft iron sheet 8 is hooked by the metal hook, and a driver for driving the soft iron sheet to swing and an overall power supply for supplying power to the driver and the color flame projectors are arranged below the soft iron sheet. In this case, the included angle reflecting screen 5 is jointly formed by three milky films 9 distributed on the  
20 same center line at equal angles, the included angle between two adjacent milky films is 120 degrees, and a circular hole 10 for sleeving on the metal wire is formed at the lower end of the center line; the quantity of the color flame projectors 6 is the same as that of the milky films, the three color flame projectors are distributed on the same circumference at equal angles with the included angle reflecting screen as a center,  
25 and each color flame projector is located in a relationship of one-to-one correspondence with the included angle between the two adjacent milky films; each color flame projector 6 is jointly composed of a support 11, color tubes 12 arranged on the support, a color flame film 13 and a convex lens 14; the color tubes 12 are jointly composed of red, white and yellow LED tubes; the driver is composed of a  
30 circuit board 15 and an electromagnetic coil 16 fixed on the circuit board; the overall

power supply is formed by connecting a power supply 17 and a power switch 18 in series; the power supply 17 and the power switch 18 are respectively electrically connected with the circuit board to form a closed circuit, and the circuit board is electrically connected with the color tubes. When the power switch is turned on, the whole candle starts working, the color LED tubes start emitting light, and a color flame shadow is formed within the included angle between the two adjacent milky films. Because the current in the circuit board can produce intermittent pulse oscillation, the coil produces magnetism; the magnetism instantaneously attracts or releases the soft iron sheet, and the spring is disturbed by intermittent tension to drive the included angle display screen to move up and down, so that a vivid dynamic flame feeling is formed.

#### Embodiment 2

As shown in Fig. 4, the driver is composed of a circuit board 15 and a small fan 16 fixed on the circuit board; the overall power supply is formed by connecting a power supply 17 and a power switch 18 in series; the power supply 17 and the power switch 18 are respectively electrically connected with the circuit board to form a closed circuit, and the circuit board is electrically connected with the color tubes. When the power switch is turned on, the whole candle starts working, the color LED tubes start emitting light, and a color flame shadow is formed within the included angle between the two adjacent milky films. Because the current in the circuit board produces intermittent pulse oscillation, the fan starts rotating forwardly or reversely to produce wind power with opposite directions; the wind power instantaneously attracts or releases the soft iron sheet, and the spring is disturbed by intermittent tension to drive the included angle display screen to move up and down, so that a vivid dynamic flame feeling is formed. Others are same as in embodiment 1.

#### Embodiment 3

As shown in Fig. 5, the color tube 12 is composed of a vitelline LED tube. Others are same as in embodiment 1.

#### Embodiment 4

As shown in Fig. 6, four color flame projectors 6 matched with the included angle

reflecting screen are arranged on the plastic shell above the spring, the included angle reflecting screen 5 is jointly formed by four milky films 9 distributed on the same center line at equal angles, the included angle between two adjacent milky films is 90 degrees, and a circular hole 10 for sleeving on the metal wire is formed at the lower end of the center line; the quantity of the color flame projectors 6 is the same as that of the milky films, the four color flame projectors are distributed on the same circumference at equal angles with the included angle reflecting screen as a center, and each color flame projector is located in a relationship of one-to-one correspondence with the included angle between the two adjacent milky films. Others are same as in embodiment 1.

#### Embodiment 5

As shown in Fig. 7, five color flame projectors 6 matched with the included angle reflecting screen are arranged on the plastic shell above the spring, the included angle reflecting screen 5 is jointly formed by five milky films 9 distributed on the same center line at equal angles, the included angle between two adjacent milky films is 72 degrees, and a circular hole 10 for sleeving on the metal wire is formed at the lower end of the center line; the quantity of the color flame projectors 6 is the same as that of the milky films, the five color flame projectors are distributed on the same circumference at equal angles with the included angle reflecting screen as a center, and each color flame projector is located in a relationship of one-to-one correspondence with the included angle between the two adjacent milky films. Others are same as in embodiment 1.

#### Embodiment 6

As shown in Fig. 8, six color flame projectors 6 matched with the included angle reflecting screen are arranged on the plastic shell above the spring, the included angle reflecting screen 5 is jointly formed by six milky films 9 distributed on the same center line at equal angles, the included angle between two adjacent milky films is 60 degrees, and a circular hole 10 for sleeving on the metal wire is formed at the lower end of the center line; the quantity of the color flame projectors 6 is the same as that of the milky films, the six color flame projectors are distributed on the same

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circumference at equal angles with the included angle reflecting screen as a center, and each color flame projector is located in a relationship of one-to-one correspondence with the included angle between the two adjacent milky films. Others are same as in embodiment 1.

5    2    ■ Non-claimed    ■ 2    Embodiment 7

As shown in Fig. 9, the supporting rod 7 with the concave point, the metal ring 4 and the metal hook 19 are removed, the original spring is replaced by a long spring 20, a positioning column 21 fixedly connected with the included angle reflecting screen is inserted into the upper end of the long spring, a positioning column 21 fixedly  
10 connected with a base 22 is also inserted into the lower end of the long spring, the circuit board 15 is erected on the base, the power supply 17 and the electromagnetic coil 16 are mounted on the circuit board 15, the soft iron sheet located corresponding to the electromagnetic coil is arranged on the lateral surface of the long spring. Others are same as in embodiment 1.

15    2    ■ Non-claimed    ■ 2    Embodiment 8

As shown in Fig. 10, the long spring and the positioning columns positioned at the upper and lower ends of the long spring in embodiment 7 are replaced by a linear spring 23. Others are same as in embodiment 1.

~~The above technical solutions merely embody preferred ones of the technical  
20 solutions of the present invention, some alterations which may be made to some parts thereof by those skilled in the art embody the principle of the present invention, and fall into the protection scope of the present invention.~~

## Claims

1. An electronic candle, comprising a plastic wrapper and a white wax shell (1) therein, wherein a spring (2) is arranged inside the plastic wrapper and the white wax shell (1) therein, an upright metal wire (3) is arranged at the upper end of the spring, a metal ring (4) is arranged at the lower end of the spring, the metal wire is sleeved with an included angle reflecting screen (5), a plurality of color flame projectors (6) matched with the included angle reflecting screen are arranged on the plastic shell above the spring, a supporting rod (7) with a concave point is arranged on the white wax shell below the spring, the supporting rod with the concave point transversely penetrates through the metal ring, a metal hook (19) is arranged at the lower end of the metal ring, a soft iron sheet (8) is connected to the metal hook, and a driver for driving the soft iron sheet to swing and an overall power supply for supplying power to the driver and the color flame projectors are arranged below the soft iron sheet.
2. The electronic candle of claim 1, wherein the included angle reflecting screen (5) is formed jointly by a plurality of milky films (9) distributed on the same center line at equal angles, and a circular hole (10) for sleeving on the metal wire is formed at the lower end of the center line.
3. The electronic candle of claim 2, wherein the quantity of the plurality of color flame projectors (6) is the same as that of the milky films, the plurality of color flame projectors are distributed on the same circumference at equal angles with the included angle reflecting screen as a center, and each color flame projector is located in a relationship of one-to-one correspondence with the included angle between two adjacent milky films.
4. The electronic candle of claim 3, wherein each color flame projector (6) is jointly composed of a support (11), color tubes (12) arranged on the support, a color flame film (13) and a convex lens (14).
5. The electronic candle of claim 4, wherein the color tubes (12) are jointly composed of red, white and yellow LED tubes.



6. The electronic candle of claim 1, wherein the driver is composed of a circuit board (15) and an electromagnetic coil (16) fixed on the circuit board.
7. The electronic candle of claim 1, wherein the overall power supply is formed by connecting a power supply (17) and a power switch (18) in series.
- 5 8. The electronic candle of claim 5, 6 or 7, wherein the power supply (17) and the power switch (18) are respectively electrically connected with the circuit board to form a closed circuit, and the circuit board is electrically connected with the color tubes.
9. The electronic candle of claim 2, wherein the included angle between the two  
10 adjacent milky films of the included angle display screen (5) is 0-120 degrees.
10. The electronic candle of claim 1, wherein the metal ring (4) is positioned within an area of the supporting rod where the concave point is located.

Drawings

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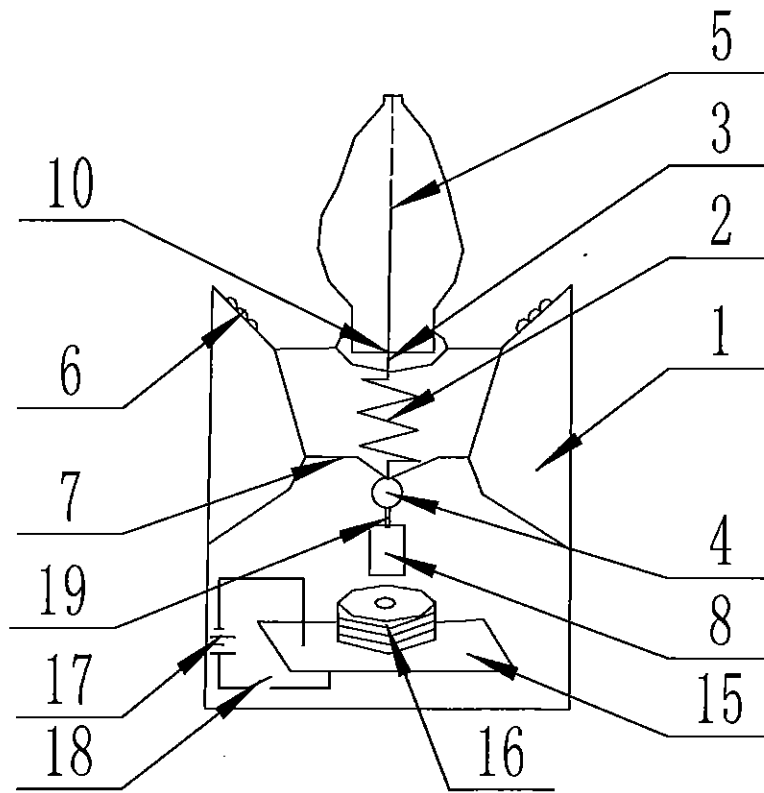


Fig. 1

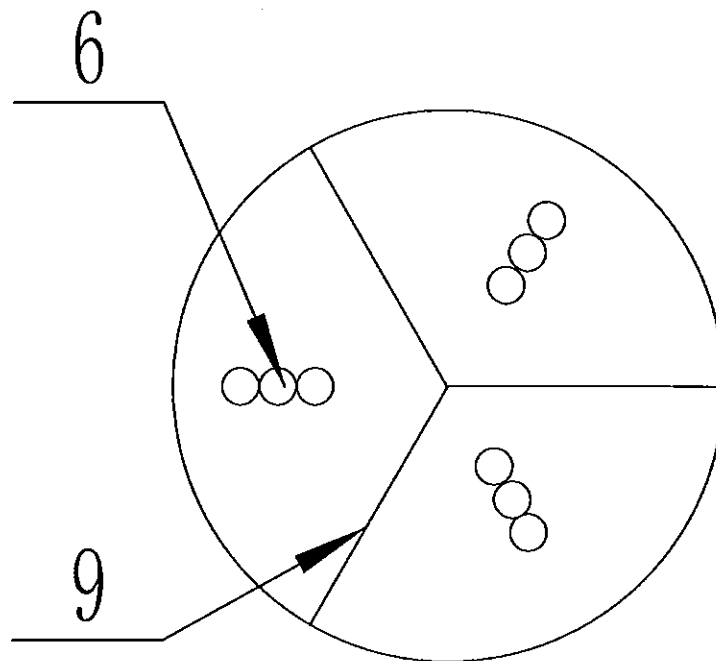


Fig. 2

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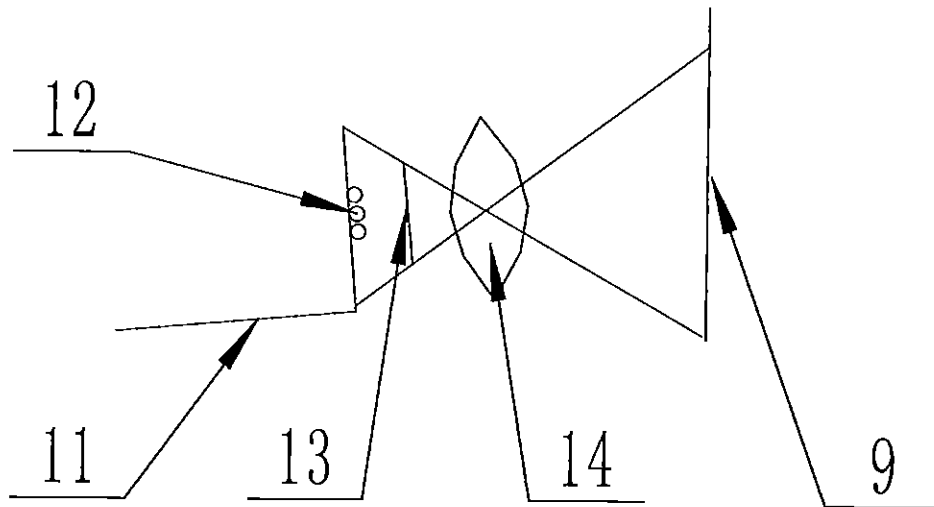


Fig. 3

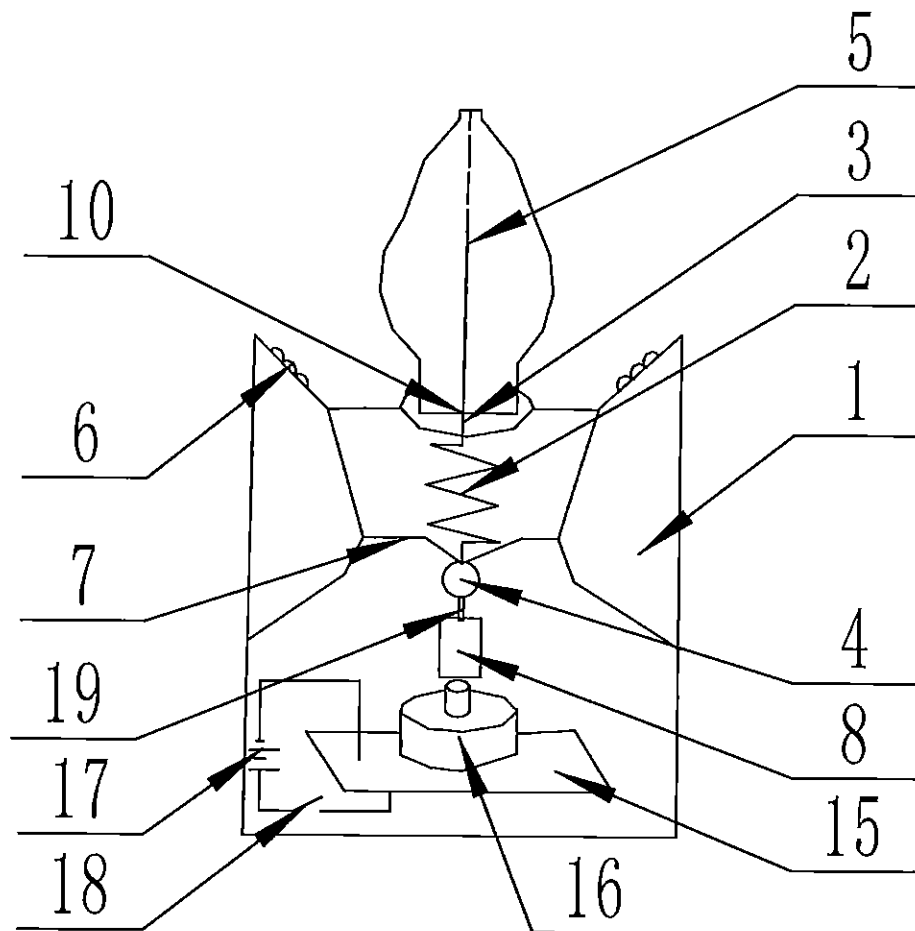


Fig. 4

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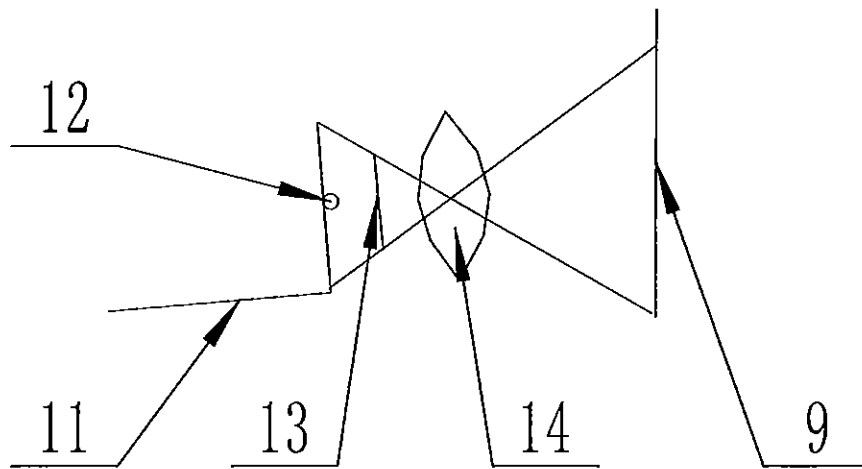


Fig. 5

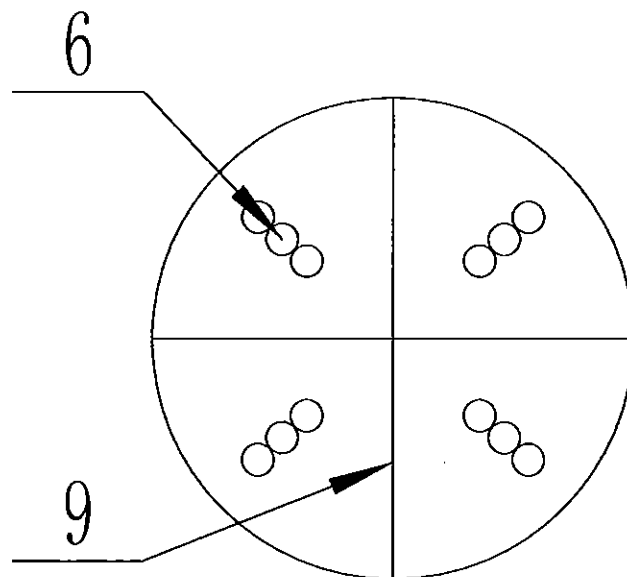


Fig. 6

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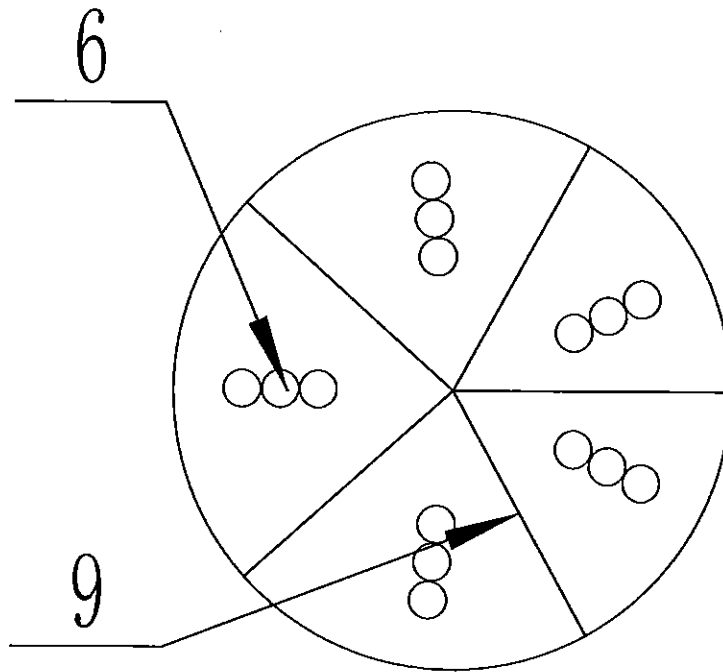


Fig. 7

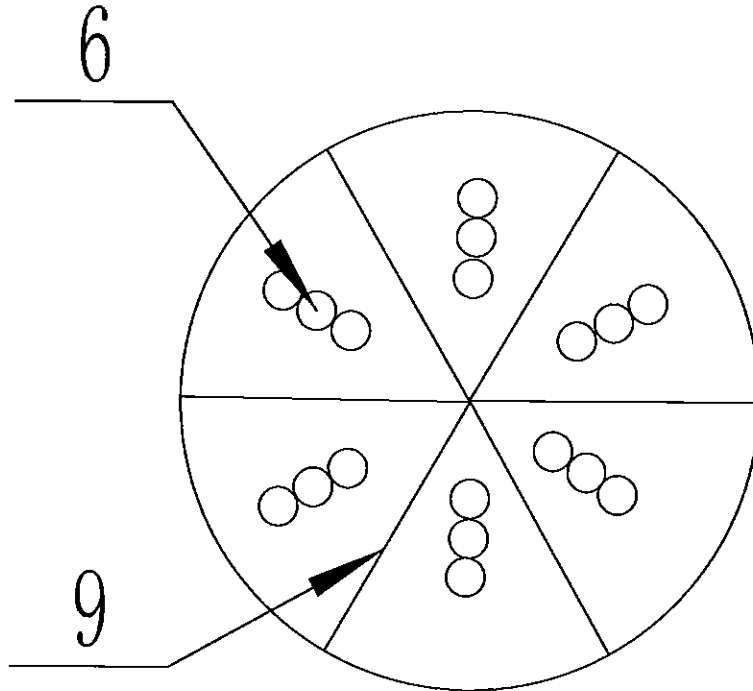


Fig. 8

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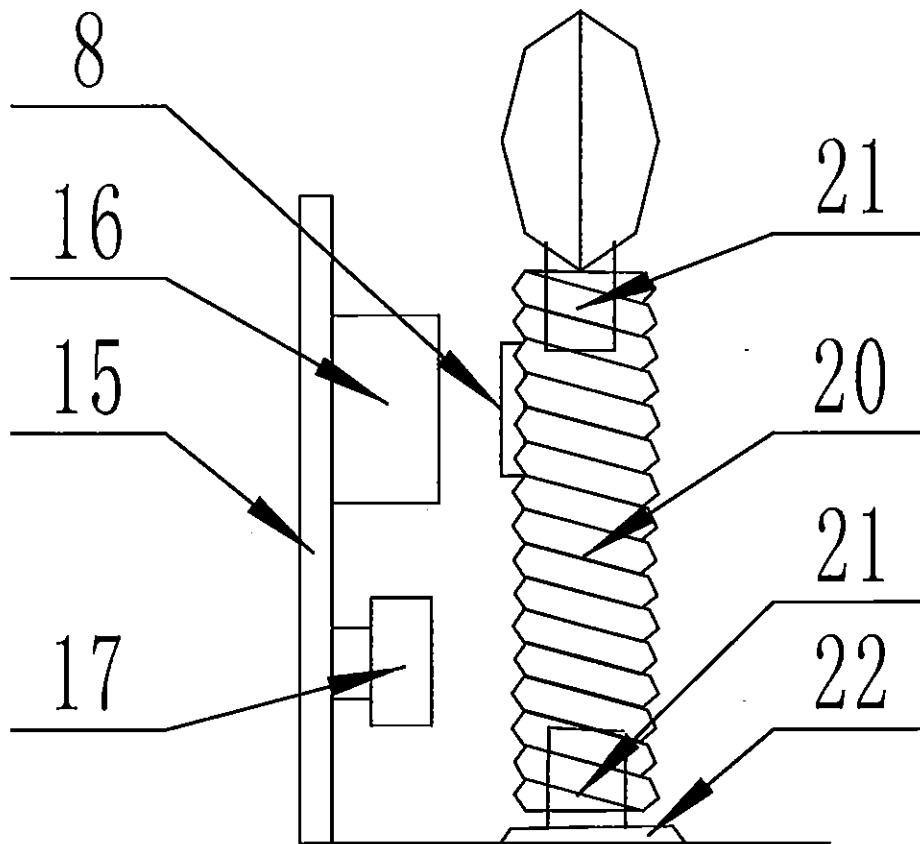


Fig. 9

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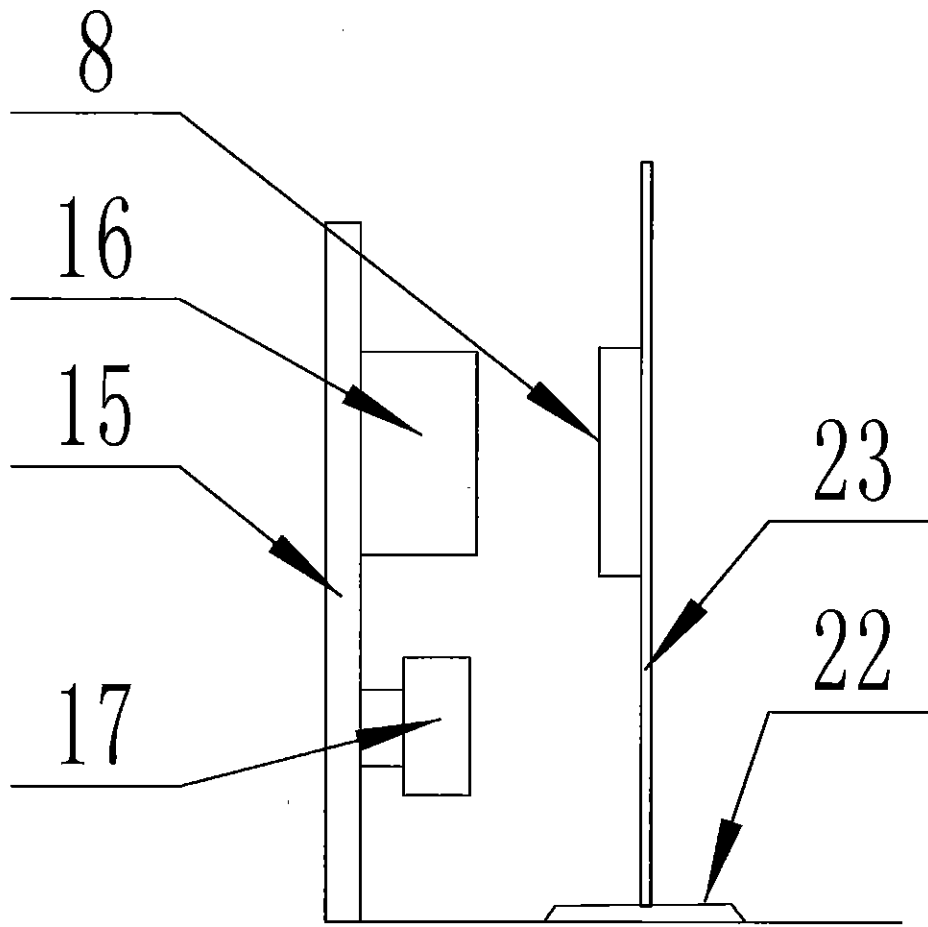


Fig. 10