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(71) Applicant: **Ninghai Ruihai Electric Appliance Co., Ltd.**
Ningbo, Zhejiang (CN)

(72) Inventor: **Yu, Haibo**
Ningbo, Zhejiang, 315600 (CN)

(74) Representative: **Huang, Liwei**
Cäcilienstraße 12
40597 Düsseldorf (DE)

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(54) **HANDHELD LED LAMP**

(57) The present invention provides a handheld lamp, preferably a handheld LED lamp, including an illuminant end (1) and a handle end (2) which are connected to each other, wherein the handle end (2) is provided with a battery and a switch (4) connected to the battery, the illuminant end (1) is provided with a main body (11), a light source (121) is mounted on the upper side of the main body (11); a matching portion (113) is provided in the lower part of the main body (11), wherein the matching portion (113) is so structured that two matching portions (13) of two handheld lamps can match with each other and can be assembled together. Thereby, the effect of omnidirectional illumination is achieved.

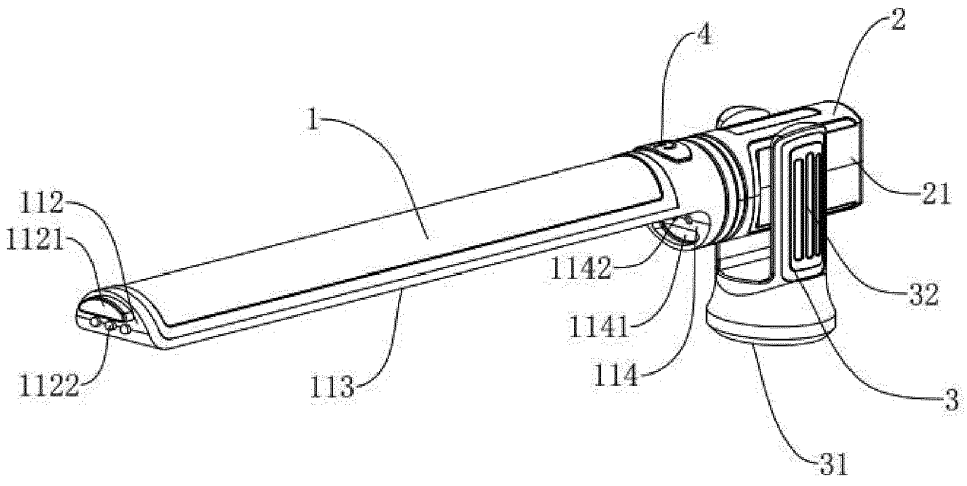

FIG. 1

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Description

Technical Field

[0001] The present invention relates to lighting equipments, more particularly, to a handheld LED lamp.

Background Art

[0002] A handheld lighting tool is a lighting device, which converts the electric energy of battery into visible light, without being connected to a light source by wires. It can significantly improve the practical performance of lighting tools.

[0003] The Chinese patent publication CN108019638A discloses a single-light-source handheld LED lamp, which comprises a handheld body, a ring disposed at the end of the handheld body, and an illuminating device disposed at the front end of the handheld body; wherein a rechargeable power source, a control PCB (Printed Circuit Board) and a retractable charging plug are arranged in the handheld body; wherein the rechargeable power source is electrically connected to the retractable charging plug through a power cord, and the outer wall of the handheld body is provided with an indicator light for indicating the charging state, and the indicator light is electrically connected to the control PCB through the handheld body; the illuminating device comprises a light cover, LED lamp beads disposed in the light cover; a switch button outside the handheld body is coupled and connected to the control PCB; the handheld body is also provided with a USB interface which is electrically connected to the control PCB.

[0004] Besides, the Chinese patent publication CN108131578A discloses a handheld LED illumination lamp, comprising a lamp head and a lamp body, the lamp head is provided with LED lamp beads, the lamp body is provided with a battery, wherein the battery supplies electric power to the LED lamp beads; a flip panel is provided in the lamp head, and the flip panel is connected with a flipping device; the number of LED lamp beads is two, which are installed on the front side and the back side of the flip panel respectively.

[0005] However, the above-mentioned single-light-source handheld LED lamp and the above-mentioned handheld LED lamp can only be used in a handheld manner, which is not very convenient. Besides, the direction of illumination is a single direction, and the illumination performance is weak. Thus, it needs to be improved.

Summary of the Invention

[0006] In view of the shortages in the prior art, an object of the present invention is to provide a handheld LED lamp which has the advantages of being convenient in use and having remarkable lighting performance.

[0007] To achieve the above object, the present invention provides a handheld lamp, preferably a handheld LED lamp as described in the claim 1 as well as its dependent claims.

[0008] To be more specific, a handheld lamp, comprising an illuminant end and a handle end which are connected to each other. The handle end is provided with a battery and a switch connected to the battery, the illuminant end is provided with a main body, a light source is mounted on the upper side of the main body; characterized in that a matching portion is provided in the lower part of the main body, wherein the matching portion is so structured that two matching portions of two handheld lamps can match with each other and can be assembled together.

[0009] Furthermore, an outside surface part may be provided at the main body and is connected to the matching portion; an inside surface part is provided at the handle end and is connected to the matching portion; and they are so structured that the inside surface part of one handheld lamp can be coupled with the outside surface part of another handheld lamp, when two handheld lamp are assembled together.

[0010] More preferably, there are fixing members for fixing two handheld lamps together, for example the fixing members include a protrusion and a slot.

[0011] By adopting the above technical solutions, the handle end is used for holding the handheld LED lamp to facilitate the use of the handheld LED lamp; when the two handheld LED lamps are used in combination, the matching portions of the two handheld LED lamps match each other and fit together. Besides, the outside surface part of one handheld LED lamp and the inside surface part of the other handheld LED lamp match each other and fit together. Furthermore, the two handheld LED lamps are fixed together by the fixing members. After both of the two handheld LED lamps are turned on by switch(s) 4, the effect of omnidirectional illumination is achieved, which significantly improves the usability of the handheld LED lamp.

[0012] Preferably, it is so configured that when two handheld lamps are assembled together, one switch is able to turn on or off two handheld lamps at the same time.

[0013] For example, the outside surface part is provided with at least two inserting bolts which are respectively connected to the positive electrode and the negative electrode of the power module or of the light source; and the inside surface part is provided with at least two sockets, wherein a socket matches a inserting bolt and is connected to the positive or negative electrode of the power module or the light source.

[0014] By adopting the above technical solution, when two handheld LED lamps are connected and assembled together, the inserting bolt is inserted into a corresponding socket, so that when the switch on one of the handheld LED lamps is switched on, both two lamps are turned on. Thus, the switch on each handheld LED lamp is able to turn on or off the two handheld lamps simultaneously. Thereby, not only the effect of the illumination of the handheld LED lamp is improved, but also the convenience of

the use of the handheld LED lamp is improved.

[0015] Preferably, one end of the inserting bolt is provided with a connecting conductor, the connecting conductor is sleeved with a spring, and a connecting terminal is fixedly arranged in the main body.

[0016] More preferably, when in a relaxed state, the difference between the length of the inserting bolt protruding out of the outside surface part and the depth of the socket is equal to or larger than the distance between the connecting conductor and the connecting terminal in an unconnected state.

[0017] By adopting the above technical solution, when the outside surface part of one handheld LED lamp comes close to the inside surface part of the other handheld LED lamp, the inserting bolt is pushed into the socket, and the spring is compressed, until one end of the inserting bolt comes into contact with the connecting terminal, thereby forming an effectively connected circuit loop. Besides, when only one single handheld LED lamp is in use, the occurrence of an electric shock caused by a hand accidentally touching the inserting bolt can be effectively avoided.

[0018] Preferably, a rotating body is rotatably connected to the handle end, wherein the rotating body is used for helping to fix the two connected handheld lamps on a base surface.

[0019] Furthermore, the rotating body may comprise a bottom plate, and a magnet is provided at the bottom of the bottom plate.

[0020] By adopting the above technical solution, the rotating body can rotate relative to the handle end, so that the bottom plate(s) can be placed on a base surface in a stable way. Thereby the convenience of use of the handheld LED lamp is remarkably improved. Because the two combined handheld LED lamps illuminate both the upper side and the lower side, it has a very good lighting effect. When it is a metal surface magnetically attractive to the magnet, the magnet at the bottom plate can fix the handheld LED lamp(s) on the metal surface, thereby further improving the convenience of use of the handheld LED lamp(s).

[0021] In summary, the present invention has the following beneficial effects: by using two handheld LED lamps in combination, the purpose of significantly improving the lighting effect can be achieved. By using the connection through the paired bolts and sockets, only one of the switches can control both two handheld lamps simultaneously when the two handheld lamps are used in a combined state. It is convenient in use and the lighting effect is excellent.

Brief Description of Drawings

[0022]

Figure 1 is a schematic diagram of the structure of the embodiments;

Figure 2 is a schematic diagram of the exploded structure of the embodiments;

Figure 3 is a schematic diagram of a partial cross-sectional structure of the embodiments;

Figure 4 is an enlarged schematic view of portion A in Figure 3;

Figure 5 is a schematic diagram showing that two LED lamps according to the embodiments are combined into one lamp and the combined lamp is in a standing position;

Figure 6 is a schematic diagram explaining a circuit structure of two handheld LED lamps according to our Embodiment 1;

Figure 7 is a schematic diagram explaining a circuit structure of two handheld LED lamps according to our Embodiment 2.

[0023] Description of reference signs: 1, illuminant end; 11, main body; 111, upper side portion for fixing; 112, outside surface part; 1121, protrusion; 1122, inserting bolt; 1123, connecting conductor; 113, underside portion for matching; 114, inside surface part; 1141, slot; 1142, socket; 12, light control portion; 121, LED lamp panel; 13, outer cover; 2, handle end; 21, rotating side face; 31, bottom plate; 32, rotating side panel; 4, switch; 5, connecting terminal; 6, spring.

Detailed Embodiments

[0024] In order to make the technical solutions and the advantages of the present invention more clear, the present invention will be further illustrated in detail as below with reference to the accompanying drawings.

Embodiment 1

[0025] As shown in FIG. 1, a handheld LED lamp includes an illuminant end 1 and a handle end 2 which are connected to each other. The handle end 2 is used for holding the handheld LED lamp by hand, which facilitates the use of the handheld LED lamp. The handle end 2 is provided with a power module including a battery (or a battery pack), as well as a switch 4 connected to the power module for controlling the light source in the illuminant end 1 to be turned on or off. Thereby, the switch 4 can be conveniently controlled by a hand holding the handle end 2, and the function of turning on or off the light source is therefore fulfilled.

[0026] As shown in FIGS. 1 and 2, the light source is preferably an LED lamp panel 121. For example, the illuminant end 1 is provided with a main body 11, a light control portion 12 for mounting or fixing the LED lamp panel 121, and an outer cover 13 covering the LED lamp

panel 121, sequentially from the bottom to the top. By using the LED lamp panel 121 as a light source, it can save energy and protect environment. Because the LED lamp panel 121 is formed by integrating several electronic components, and the LED lamp panel 121 is wrapped and protected by the outer cover 13, the performance lifetime of the LED panel 121 can be longer.

[0027] In the lower part of the main body 11 there is a matching portion 113, wherein two matching portions 13 of two handheld LED lamps can match with each other and can be assembled together.

[0028] In one embodiment, an outside surface part 112 is provided at the main body 11 and is connected to the matching portion 113. An inside surface part 114 is provided at the handle end 2. The inside surface part 114 is also connected to the matching portion 113. The inside surface part 114 matches the outside surface part 112, so that the inside surface part 114 of one handheld LED lamp can be coupled with the outside surface part 112 of another handheld LED lamp, when two handheld LED lamp are assembled together.

[0029] Preferably, there are fixing members for fixing two handheld LED lamps together. For example, the fixing members may be provided on the outside surface part 112 and/or the inside surface part 114 respectively.

[0030] When two handheld LED lamps are used in combination, as shown in FIG. 5, the matching portions 113 of the two handheld LED lamps match each other and fit together. Besides, the outside surface part 112 of one handheld LED lamp and the inside surface part 114 of the other handheld LED lamp match each other and fit together. Furthermore, the two handheld LED lamps are fixed together by the fixing members.

[0031] After both of the two handheld LED lamps are turned on by switch(s) 4, the effect of omnidirectional illumination is achieved, which significantly improves the usability of the handheld LED lamp.

[0032] As an example, the fixing members may include a protrusion 1121 disposed at the outside surface part 112, and a slot 1141 disposed at the inside surface part 114, wherein the protrusion 1121 and the slot 1141 match with each other. And when the protrusion 1121 is inserted into the slot 1141, the two handheld LED lamps are assembled (combined) together. The structure is simple and it is easy to use, which significantly reduces the difficulty of combining two handheld LED lamps, and further improves the convenience of using the handheld LED lamps in combination.

[0033] In order to further improve the stability of the connection between two handheld LEDs, magnet(s) for applying attractive force(s) may be provided on the protrusion 1121 and/or in the slot 1141, respectively, which can further improves the convenience of the use of the handheld LED lamps.

[0034] In one embodiment of the present invention, each switch 4 controls each handheld LED lamp separately, even when two handheld LED lamps are assembled together. That means, a user needs to switch on both two switches, in order to turn on both two lamps. That causes more or less inconvenience when the two lamps are used in combination.

[0035] Thus, in a preferred embodiment of the Embodiment 1, the handheld lamp is so designed that one switch 4 can turn on or off two handheld lamps at the same time, when two handheld lamps are assembled together.

[0036] Figure 6 schematically shows a circuit structure of two handheld lamps according to our Embodiment 1. The left side of Figure 6 shows a handheld lamp, comprising a power module, which can supply power to the lamp, a switch, which controls the circuit to be connected or disconnected, and a lamp, which converts electrical energy into light, thus forming a lighting circuit. Meanwhile, the circuit is provided with a port 1 which can connect the positive electrode of the power module or of the light resource (lamp) with an external circuit, as well as a port 2 which can connect the negative electrode of the power module or of the light resource (lamp) with an external circuit.

[0037] The right side of Figure 6 shows another handheld lamp which is identical to the handheld lamp of the left side but is placed in a symmetrical position.

[0038] When the port 1 of one handheld lamp is connected to the port 1 of another handheld lamp, and the port 2 of one handheld lamp is connected to the port 2 of another handheld lamp, the circuits in two handheld LED lamps are combined into a whole circuit.

[0039] In this combined circuit, when both two switches are switched off, the two lamps are turned off. When only one switch is switched on, both two lamps are turned on. When this one switch is switched off again, both two lamps are turned off again. Thus, it is possible to use only one of the two switches to turn on and then turn off the two lamps simultaneously. Thereby, the convenience of the use of the handheld LED lamp is significantly improved.

[0040] By the way, in this combined circuit as shown in Fig. 6, when both two switches are switched on, both two lamps are turned on.

[0041] As an example, the port 1 and/or the port 2 are preferably provided at the outside surface part 112 and/or inside surface part 114.

[0042] In an example shown in FIG. 2, the outside surface part 112 is provided with at least two inserting bolts 1122. For example, the inserting bolts 1122 may have a shape of cylinder. In one embodiment, the first inserting bolt 1122 belongs to port 1 in Fig. 6 and is therefore connected to the positive electrode of the power module or of the light source (lamp); the second inserting bolt 1122 belongs to port 2 in Fig. 6 and is therefore connected to the negative electrode of the power module or of the light source (lamp).

[0043] Correspondingly, the inside surface part 114 is provided with at least two sockets 1142. The socket 1142 matches the inserting bolt 1122 and is therefore connected to the positive or negative electrode of the power module or of the light source. In one embodiment, the first

socket 1142 belongs to port 1 in Fig. 6 and is therefore connected to the positive electrode of the power module or of the light source (lamp); the second socket 1142 belongs to port 2 in Fig. 6 and is therefore connected to the negative electrode of the power module or of the light source (lamp).

[0044] Thereby, each port (port 1 or port 2) may include an inserting bolt 1122 and a socket 1142 which are connected by a conducting wire.

[0045] In another embodiment, three inserting bolts 1122 and three sockets 1142 are provided, wherein the third inserting bolt 1122 and the third socket 1142 are used for connecting the ground wire.

[0046] When two handheld LED lamps are connected and assembled together, the inserting bolts 1122 are inserted into corresponding sockets 1142. In this combined state, when the switch 4 on one of the handheld LED lamps is switched on, the power module connected to the switch 4 can supply electric energy to the light source of the other handheld LED lamp through the inserting bolts 1122 and the corresponding sockets1142. Thus, the switch 4 on each handheld LED lamp is able to turn on or off the two handheld lamps simultaneously. Thereby, the convenience of the use of the handheld LED lamp is improved.

[0047] More preferably, as shown in FIG. 3 and FIG. 4, one end of the inserting bolt 1122 is provided with a connecting conductor 1123. The connecting conductor 1123 is sleeved with a spring 6. Optionally, one end (side) of the spring 6 is connected to the inserting bolt 1122 and the other end (side) of the spring 6 is connected to the main body 11. A connecting terminal 5 is fixedly arranged in the main body 11, and the connecting terminal 5 is connected to the internal circuit, for example, connected to the positive electrode or the negative electrode of the power module or of the light source or the ground.

[0048] Preferably, it is so configured that when the inserting bolt 1122 is inserted into the socket 1142, the spring 6 is compressed and the connecting conductor 1123 at the inserting bolt 1122 is in contact with the connecting terminal 5, thereby forming an effectively connected circuit loop. Besides, it is so configured that when the inserting bolt 1122 is not inserted into the socket 1142, the inserting bolt 1122 is in a state (a relaxed state) of being disconnected from the internal circuit. Thus, when only one single handheld LED lamp is in use, the occurrence of an electric shock caused by a hand accidentally touching the inserting bolt 1122 can be effectively avoided.

[0049] For example, when in a relaxed state, the difference between the length of the inserting bolt 1122 protruding out of the outside surface part 112 and the depth of the socket 1142 may be equal to or larger than the distance between the connecting conductor 1123 and the connecting terminal 5 in an unconnected state. Thus, when the outside surface part 112 of one handheld LED lamp comes close to the inside surface part 114 of the other handheld LED lamp, the inserting bolt 1122 is pushed into the socket 1142, and the spring 6 is compressed, until one end of the inserting bolt 1122 comes into contact with the connecting terminal 5, thereby forming an effectively connected circuit loop.

[0050] As shown in FIG. 1 and FIG. 2, the switch 4 is preferably disposed on the upper side of the handle end 2, so that it is more convenient to turn on or off the light source of the handheld LED lamp.

[0051] More preferably, a rotating body 3 is rotatably connected to the handle end 2. The rotating body 3 helps to fix the two connected handheld LED lamps on a base surface. The base surface may be a bottom surface, a table surface or any surface on which an object can be placed.

[0052] In one embodiment, the handle end 2 has two rotating side faces 21 on the left and right sides thereof. And the rotating body 3 comprises two rotating side panels 32, which are rotatably connected to the rotating side faces 21 of the handle end 2, for example by an axis pin.

[0053] More preferably, the rotating body 3 further comprises a bottom plate 31. After the two handheld LED lamps are combined into a whole, the rotating body 3 can rotate relative to the handle end 2, so that the bottom plate(s) 31 can be placed on a base surface in a stable way. Thereby the convenience of use of the handheld LED lamp is remarkably improved.

[0054] Because the two combined handheld LED lamps illuminate both the upper side and the lower side, it has a very good lighting effect.

[0055] In one embodiment, in order to enhance the stability effect of the bottom plate 31 on the two combined handheld LED lamps, a magnet is further provided at the bottom of the bottom plate 31.

[0056] When it is a metal surface magnetically attractive to the magnet, the magnet at the bottom plate 31 can fix the handheld LED lamp(s) on the metal surface, thereby further improving the convenience of use of the handheld LED lamp(s).

Embodiment 2

[0057] Embodiment 2 differs from Embodiment 1 only in its circuit structure.

[0058] Embodiment 2 provides another circuit structure which can also achieve the goal that one switch can turn on/off two lamps simultaneously.

[0059] Figure 7 schematically shows a circuit structure of two handheld lamps according to our Embodiment 2. The left side of Figure 7 shows a handheld lamp, comprising a power module, a lamp, and a switch system. For example, the switch system comprises a mechanical switch, a CPU, and an electronic switch. The power module can supply power (electrical energy) to the whole circuit. The lamp can convert electrical energy into light, and play the role as a light resource. The mechanical switch is able to be switched between two different states, such as the state of connecting and the state of floating, and the mechanical switch is connected to a CPU. The

CPU is configured to recognize the state of the mechanical switch and then transfer the different state of the mechanical switch into different output / instruction. The electronic switch is controlled by the CPU and is configured to receive the output / instruction from the CPU and then to connect or disconnect the lighting circuit (the circuit with the light resource) according to the output / instruction from the CPU. For example, when the mechanical switch is switched into the first state such as a connecting state, the CPU recognizes the switch state as 1, and then controls / instructs the electronic switch to connect the lighting circuit. The lamp is therefore turned on. When the mechanical switch is switched into the second state such as a floating state, the CPU recognizes the switch state as 0, and then controls / instructs the electronic switch to disconnect the lighting circuit. The lamp is therefore turned off.

[0060] Meanwhile, the circuit is provided with a port 1 which can connect the positive electrode of the power module or of the light resource (lamp) with an external circuit, as well as a port 2 which can connect to the ground or can connect the negative electrode of the power module or of the light resource (lamp) with an external circuit. Besides, the circuit in the Figure 7 is provided with a port 3 which can connect the switch system with an external circuit. For example, the port 3 is connected to the conducting wire between a mechanical switch and a CPU, and therefore is connected to the output of the mechanical switch and the input of the CPU.

[0061] The right side of Figure 7 shows another handheld lamp which is identical to the handheld lamp of the left side but is placed in a symmetrical position.

[0062] When the port 1 of one handheld lamp is connected to the port 1 of another handheld lamp, the port 2 of one handheld lamp is connected to the port 2 of another handheld lamp, and the port 3 of one handheld lamp is connected to the port 3 of another handheld lamp, the circuits in two handheld LED lamps are combined into a whole circuit.

[0063] In this combined circuit, when both two mechanical switches are switched off, the two lamps are turned off. When only one mechanical switch is switched on, both two CPUs are connected to the mechanical switch and therefore would recognize the switch state as 1, thus, both two lamps are turned on. When this mechanical switch is switched off again, both two lamps are turned off again. Thus, it is possible to use only one of the two mechanical switches to turn on and then turn off the two lamps simultaneously. Thereby, the convenience of the use of the handheld LED lamp is significantly improved.

[0064] By the way, in this combined circuit as shown in Fig. 7, when both two mechanical switches are switched on, the CPU can be so configured as to recognize the state as 1, thus, both two lamps are turned on.

[0065] As an example, the port 1 and/or the port 2 and/or the port 3 are preferably provided at the outside surface part 112 and/or inside surface part 114.

[0066] In an example shown in FIG. 2, the outside surface part 112 is provided with at least three inserting bolts 1122. For example, the inserting bolts 1122 may have a shape of cylinder. In one embodiment, the first inserting bolt 1122 belongs to port 1 in Fig. 7 and is therefore connected to the positive electrode of the power module or of the light source (lamp); the second inserting bolt 1122 belongs to port 2 in Fig. 7 and is therefore connected to connect to the ground or to the negative electrode of the power module or of the light source (lamp); the third inserting bolt 1122 belongs to port 3 in Fig. 7 and is therefore connected to the switch system.

[0067] Correspondingly, the inside surface part 114 is provided with at least three sockets 1142, which match with the inserting bolts 1122. In one embodiment, the first socket 1142 belongs to port 1 in Fig. 7 and is therefore connected to the positive electrode of the power module or of the light source (lamp); the second socket 1142 belongs to port 2 in Fig. 7 and is therefore connected to the ground or to the negative electrode of the power module or of the light source (lamp); the third socket 1142 belongs to port 3 in Fig. 7 and is therefore connected to the switch system.

[0068] Thereby, each port (port 1 or port 2 or port 3) may include an inserting bolt 1122 and a socket 1142 which are connected by a conducting wire.

[0069] Compared with the Embodiment 1, the Embodiment 2 has following advantages.

[0070] In Embodiment 1, when the two handheld lamps are used in combination and only one switch is switched on, the power module of one handheld lamp may need to supply power to two lamps. Thus, there may be a risk of insufficient power.

[0071] However, In Embodiment 2, when the two handheld lamps are used in combination and only one switch is switched on, the power module of each handheld lamp supplies power to each lamp individually. Thus, it solves the problem of insufficient power, and guarantees the brightness of the illumination, and thus brings a better lighting performance.

Embodiment 3

[0072] In the Embodiment 1 or Embodiment 2, a charging system like a USB charging system may be further added. The USB charging system has a USB interface to be connected to external power, and it is used for charge the internal battery or battery pack in the power module of the handheld lamp.

[0073] The charging system such as the USB charging system is preferably added between the port 1 and the positive electrode of power module or of the light resource (lamp). For example, one end of the charging system is connected to the conducting wire between the port 1 and the positive electrode of power module or of the light resource (lamp); the other end of the charging system is connected to the ground or to the conducting wire between the port 2 and the negative electrode of power module or of the light resource (lamp). Thus, when the

two lamps are used in combination, all the batteries (or battery packs) in the two hand lamps can be charged at the same time by one charging interface (such as one USB interface). Thus, the convenience of the use of the handheld LED lamp is further improved.

[0074] The above only describes some preferred embodiments of the present invention. The scope of the protection of the present invention should not be limited to the above embodiments. All the technical solutions falling into the scope of our claims should belong to the present invention. It should be noted that those skilled in the art will be able to make further modifications and/or refinements without departing from the principles of the present invention.

Claims

1. A handheld lamp, preferably a handheld LED lamp, including an illuminant end (1) and a handle end (2) which are connected to each other, wherein the handle end (2) is provided with a power module including a battery and a switch (4) connected to the power module, the illuminant end (1) is provided with a main body (11), a light source (121) is mounted on the upper side of the main body (11); **characterized in that** a matching portion (113) is provided in the lower part of the main body (11), wherein the matching portion (113) is so structured that two matching portions (13) of two handheld lamps can match with each other and can be assembled together.

2. The handheld lamp, preferably the handheld LED lamp, according to claim 1, wherein an outside surface part (112) is provided at the main body (11) and is connected to the matching portion (113); an inside surface part (114) is provided at the handle end (2) and is connected to the matching portion (113); and they are so structured that the inside surface part (114) of one handheld lamp can be coupled with the outside surface part (112) of another handheld lamp, when two handheld lamp are assembled together.

3. The handheld lamp, preferably the handheld LED lamp, according to claim 1 or 2, wherein there are fixing members for fixing two handheld lamps together, for example the fixing members include a protrusion (1121) and a slot (1141).

4. The handheld lamp, preferably the handheld LED lamp, according to claim 3, wherein a magnet for applying attractive force is provided on the protrusion (1121) and/or in the slot (1141).

5. The handheld lamp, preferably the handheld LED lamp, according to any one of claims 1 to 4, wherein it is so configured that when two handheld lamps are assembled together, one switch (4) is able to turn on or off two handheld lamps at the same time.

6. The handheld lamp, preferably the handheld LED lamp, according to claim 5, wherein the handheld lamp is provided with at least two ports, wherein the first port is so configured as to be able to connect the positive electrode of the power module or of the light resource with an external circuit, the second port is connected with the ground or is so configured as to be able to connect the negative electrode of the power module or of the light resource with an external circuit.

7. The handheld lamp, preferably the handheld LED lamp, according to claim 5, wherein the handheld lamp is provided with at least three ports, wherein the first port is so configured as to be able to connect the positive electrode of the power module or of the light resource with an external circuit, the second port is connected with the ground or is so configured as to be able to connect the negative electrode of the power module or of the light resource with an external circuit, the third port is so configured as to be able to connect the switch system with an external circuit.

8. The handheld lamp, preferably the handheld LED lamp, according to claim 6 or 7, wherein each port includes an inserting bolt 1122 and a socket 1142, which are connected by a conducting wire.

9. The handheld lamp, preferably the handheld LED lamp, according to claim 8, wherein one end of the inserting bolt (1122) is provided with a connecting conductor (1123), the connecting conductor (1123) is sleeved with a spring (6), and a connecting terminal (5) is fixedly arranged in the main body (11).

10. The handheld lamp, preferably the handheld LED lamp, according to claim 9, wherein, when in a relaxed state, the difference between the length of the inserting bolt (1122) protruding out of the outside surface part (112) and the depth of the socket (1142) is equal to or larger than the distance between the connecting conductor (1123) and the connecting terminal (5) in an unconnected state.

11. The handheld lamp, preferably the handheld LED lamp, according to any of claims 1 to 10, a rotating body (3) is rotatably connected to the handle end (2), wherein the rotating body (3) is suitable for helping to fix the two connected handheld lamps on a base surface.

12. The handheld lamp, preferably the handheld LED lamp, according to claim11, wherein the rotating body (3) further comprises a bottom plate (31), and a magnet is provided at the bottom of the bottom

plate (31).

Amended claims in accordance with Rule 137(2) EPC.

1. A handheld lamp, preferably a handheld LED lamp, including an illuminant end (1) and a handle end (2) which are connected to each other, wherein the handle end (2) is provided with a power module including a battery and a switch (4) connected to the power module, the illuminant end (1) is provided with a main body (11), a light source (121) is mounted on the upper side of the main body (11); a matching portion (113) is provided in the lower part of the main body (11), wherein the matching portion (113) is so structured that two matching portions (13) of two handheld lamps can match with each other and can be assembled together; wherein the handheld lamp is so configured that when two handheld lamps are assembled together, the switch (4) on each handheld lamp is able to turn on or off two handheld lamps at the same time;
characterized in that
an outside surface part (112) is provided at the main body (11) and is connected to the matching portion (113); an inside surface part (114) is provided at the handle end (2) and is connected to the matching portion (113); and they are so structured that the inside surface part (114) of one handheld lamp can be coupled with the outside surface part (112) of another handheld lamp, when two handheld lamp are assembled together;
the outside surface part is provided with at least two inserting bolts which are respectively connected to the positive electrode and the negative electrode of the power module or of the light source; and the inside surface part is provided with at least two sockets, wherein a socket matches a inserting bolt and is connected to the positive or negative electrode of the power module or the light source;
and when two handheld lamp are assembled together, the two combined handheld lamps illuminate both the upper side and the lower side.

2. The handheld lamp, preferably the handheld LED lamp, according to claim 1, wherein there are fixing members for fixing two handheld lamps together, for example the fixing members include a protrusion (1121) and a slot (1141).

3. The handheld lamp, preferably the handheld LED lamp, according to claim 2, wherein a magnet for applying attractive force is provided on the protrusion (1121) and/or in the slot (1141).

4. The handheld lamp, preferably the handheld LED lamp, according to claim 1, wherein one end of the inserting bolt (1122) is provided with a connecting conductor (1123), the connecting conductor (1123) is sleeved with a spring (6), and a connecting terminal (5) is fixedly arranged in the main body (11).

5. The handheld lamp, preferably the handheld LED lamp, according to claim 4, wherein, when in a relaxed state, the difference between the length of the inserting bolt (1122) protruding out of the outside surface part (112) and the depth of the socket (1142) is equal to or larger than the distance between the connecting conductor (1123) and the connecting terminal (5) in an unconnected state.

6. The handheld lamp, preferably the handheld LED lamp, according to any of claims 1 to 5, a rotating body (3) is rotatably connected to the handle end (2), wherein the rotating body (3) is suitable for helping to fix the two connected handheld lamps on a base surface.

7. The handheld lamp, preferably the handheld LED lamp, according to claim 6, wherein the rotating body (3) further comprises a bottom plate (31), and a magnet is provided at the bottom of the bottom plate (31).

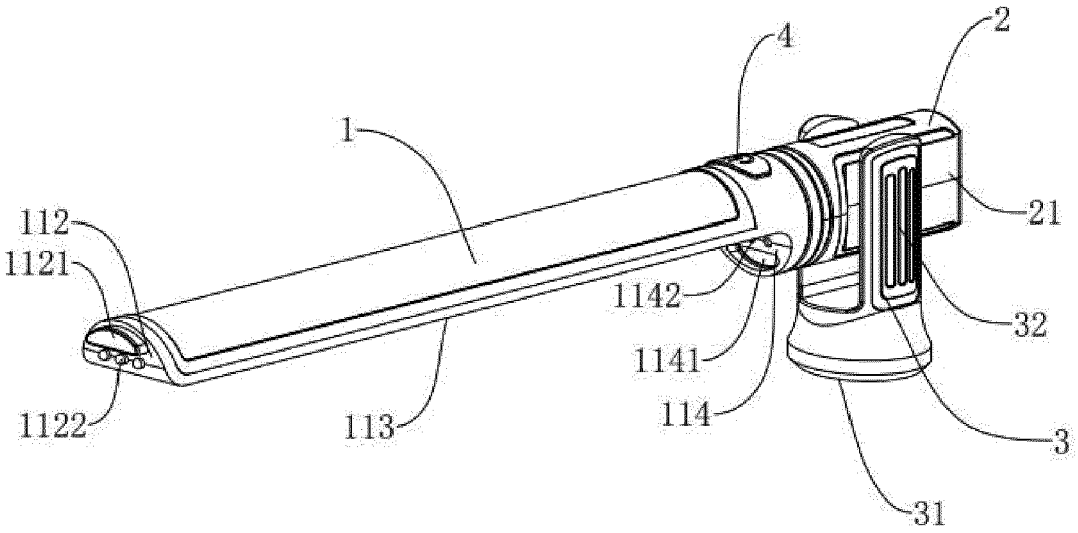
4
2
1
21
112
1121
1142
32
1141
114
1122
113
3
31

FIG. 1

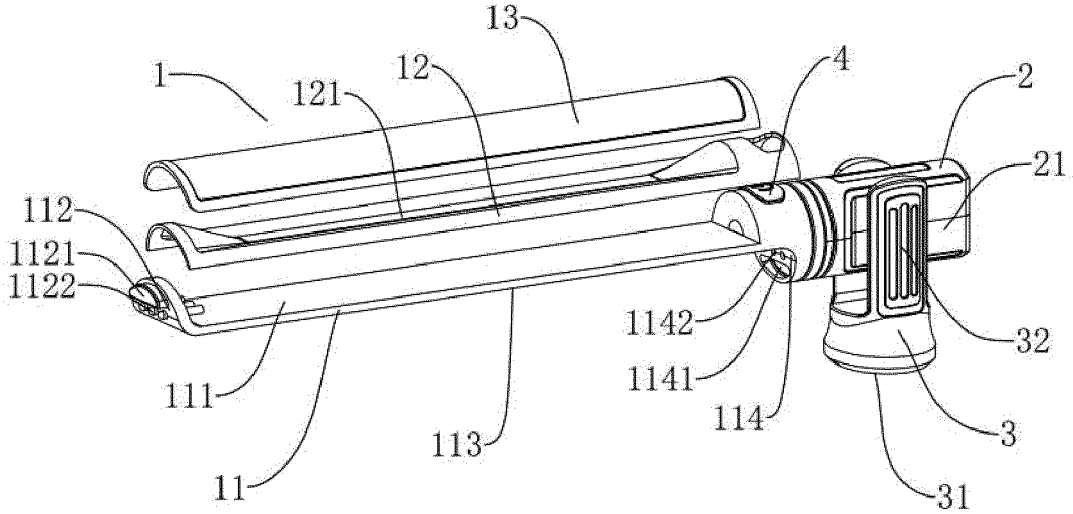
13
1
121
12
4
2
21
112
1121
1122
1142
32
1141
111
114
3
11
113
31

FIG. 2

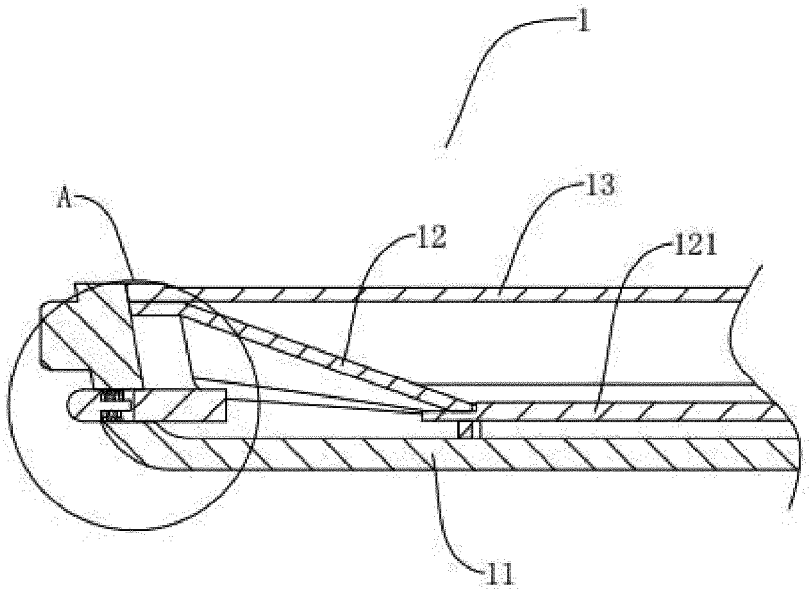

FIG. 3

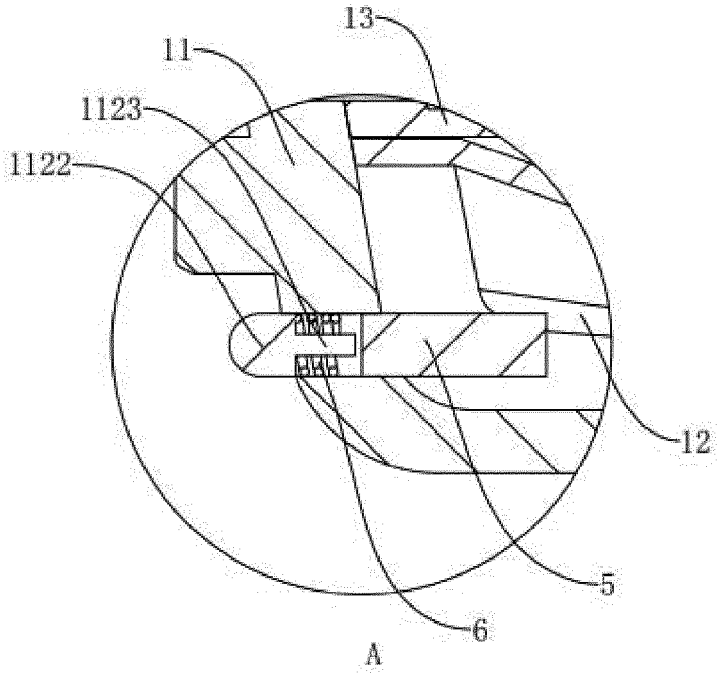

FIG. 4

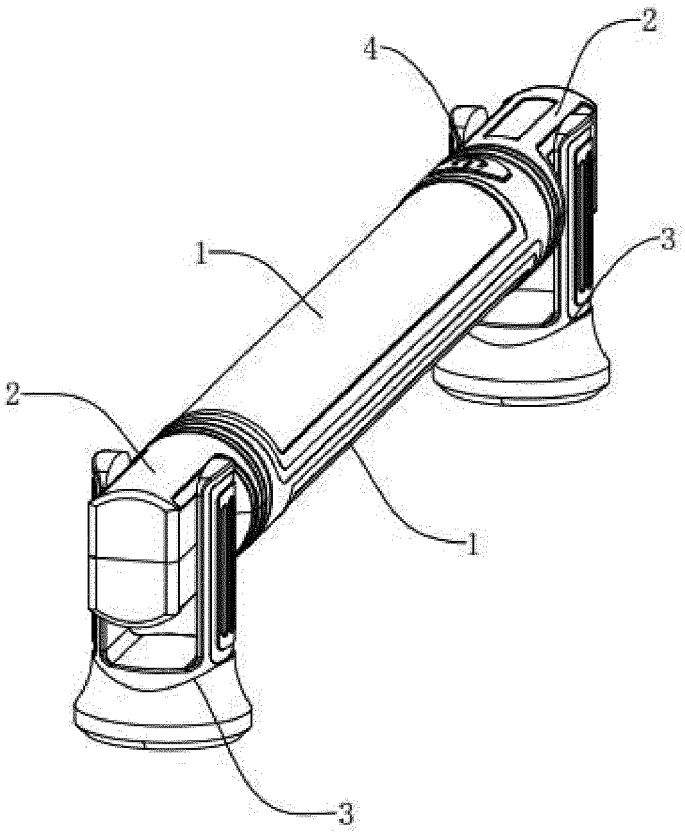

FIG. 5

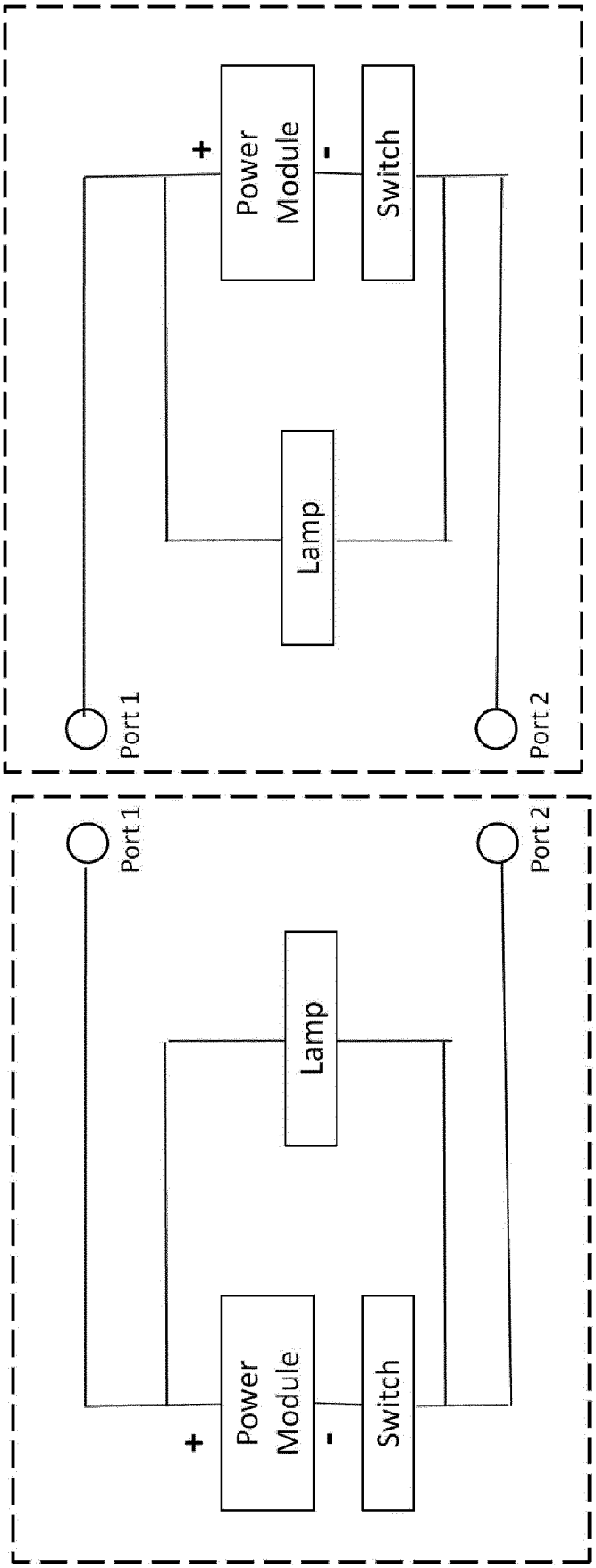
Power Module
+
-
Switch
Lamp
Port 1
Port 2
Port 1
Port 2
Lamp
Power Module
+
-
Switch

FIG. 6

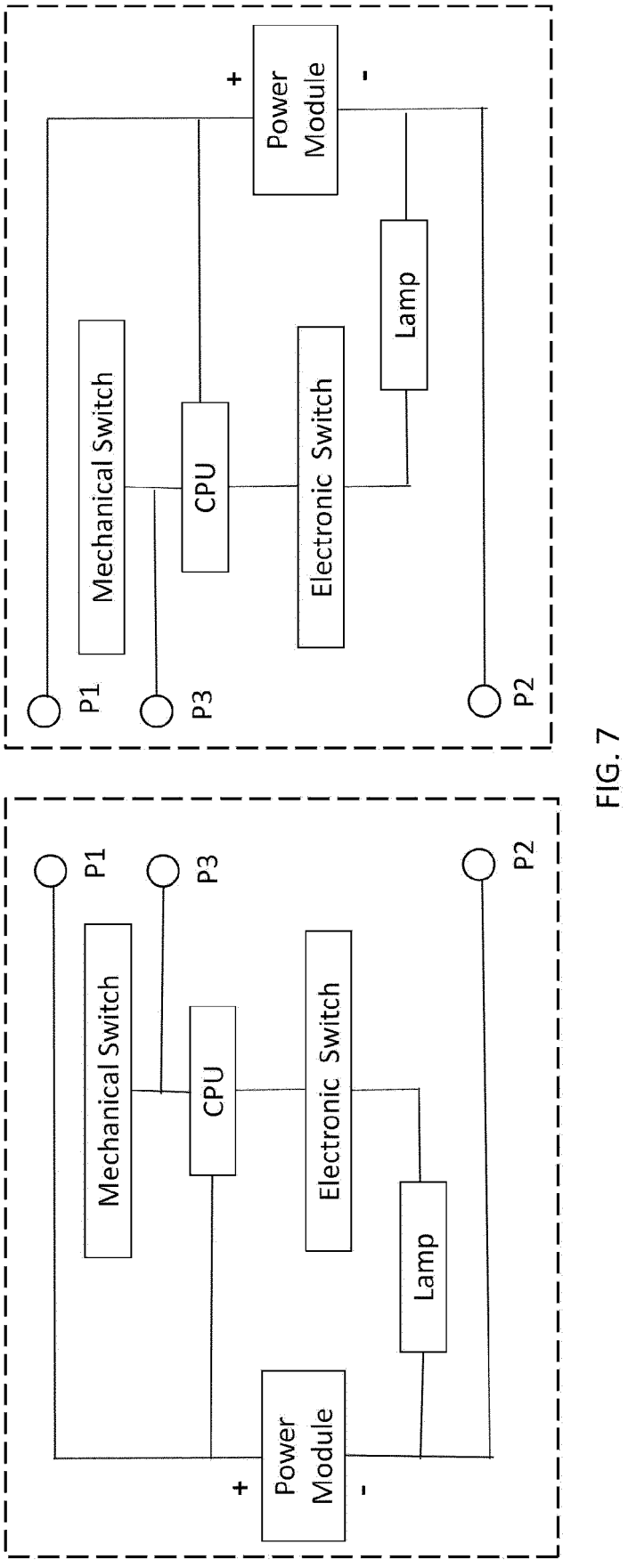
Power Module
+
-
Lamp
Mechanical Switch
CPU
Electronic Switch
P1
P3
P2
P1
P3
P2
Mechanical Switch
CPU
Electronic Switch
Lamp
Power Module
+
-

FIG. 7

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EUROPEAN SEARCH REPORT

Application Number
EP 19 20 1818

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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F21L
F21V
F21Y

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	17 February 2020	Thibaut, Arthur

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17-02-2020

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