June 21, 1960 J. STILLFRIED ET AL 2,942,103

FLASHLIGHT STRUCTURE

Filed Feb. 10, 1958

Fig. 1

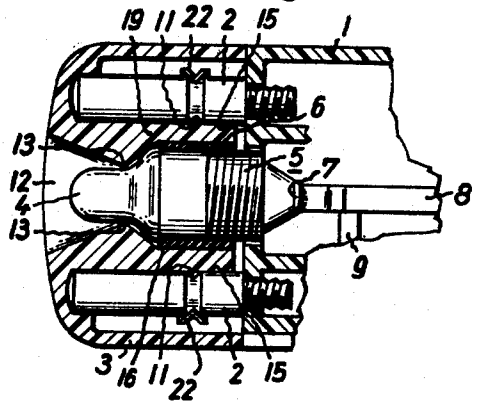


Fig. 2

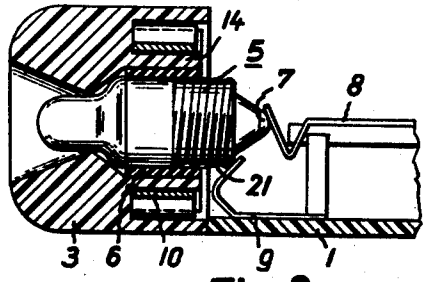
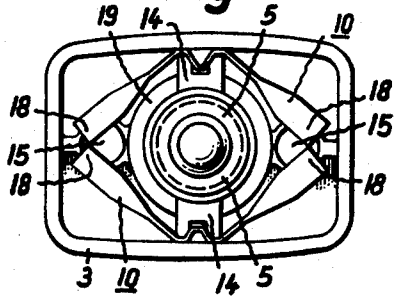


Fig. 3



Inventors:

Joachim Stillfried and
Klaus Seeliger
By Erich R. Stahl
Patent Agent

United States Patent Office 2,942,103
Patented June 21, 1960

2,942,103

FLASHLIGHT STRUCTURE

Joachim Stillfried and Klaus Seeliger, Hameln, Germany, assignors to Licentia Patent-Verwaltungs-G.m.b.H., Hamburg, Germany

Filed Feb. 10, 1958, Ser. No. 714,212

Claims priority, application Germany Feb. 11, 1957

7 Claims. (Cl. 240—10.65)

The present invention relates to portable flashlights with built-in recharging means for the batteries.

Portable or pocket flashlights with built-in recharging means have been known, in which the recharging means and the batteries are contained in a part of the housing which is provided with contact pins suitable for connecting to the utility power lines, when the batteries are to be charged. In some of the known flashlights, the lamp is provided in the part of the housing containing the battery, and the contact pins extend from the end of the housing opposite the lamp and are normally covered by a removable cap. Other known pocket flashlights are equipped with retractable contact pins which can be extended outwardly by actuating a slide provided with wedging means.

Furthermore, portable flashlights have been known which are provided with a separate lamp supporting head removably supportable on the contact pins secured to the battery containing housing. Thus, in these flashlights, the lamp head is detachably held on the battery housing by means of the contact pins. This kind of flashlight design is satisfactorily compact, because the space between the contact pins can be occupied by the lamp, whereby the overall length of the flashlight may be reduced to a handy size. The structure of the present flashlights of this type, however, has been objectionable in several respects. For example, the lamp head of such flashlights has been made in the form of two halves holding a separate reflector inserted therein and serving as a threaded socket for a special bulb not readily available on the market. In addiion, the two halves of the head casing are held together by screw means mounted on a contact bar with two contact pins. One of these pins was connected to the reflector, and thereby to the bulb socket, via a wire soldered to this pin, while the other pin was connected to the contact base of the bulb by means of a riveted spring. Two additional spring members were provided to secure the lamp head on the contact pins mounted on the battery housing. Thus, a considerable number of parts were needed for the lamp head alone, resulting in a complex design and thereby in a relatively high manufacturing costs for such a flashlight.

In a portable or pocket flashlight comprising a battery housing with built-in recharging means for the battery and with contact pins for power line connection during charging, it is an object of this invention to provide an improved lamp head adapted to receive said contact pins during normal use of the flashlight and thereby hold the head against and aligned with said battery housing. The structure of this novel and improved lamp head is simpler than that of flashlights of this type heretofore known and obviates the mentioned disadvantages of the latter.

It is, therefore, a feature of the invention to provide as such a lamp head a cap-shaped cover made of a single piece and having a bore in the form of a passage through the cap adapted to receive a bulb of the type having a built-in lens, said cap being further provided with spring

detents for gripping the contact pins when received therein to prevent accidental removal of the cap from the battery housing.

It is a further feature of the invention to dimension the length of the cap in relation to the length of the bulb, so that the contact base of the bulb will project beyond the rear of the cap to engage the contact pins at the front of the battery housing when the cap is assembled thereon, whereby the base end of the bulb will occupy a recess in the front end of the battery housing to engage therein contact springs connected to the two terminals of the battery.

It is a still further feature of the invention to use an electric bulb of the lens type having a glass envelope, the front end of which envelope has a smaller diameter than that of the bulb base, and to provide the bore in the cap with a flange-like constriction having a diameter adapted to receive and pass the smaller front end of the bulb envelope when the latter is introduced into the bore from the rear side of the cap. The bulb seats with the widening portion of its envelope on this flange-like constriction and protrudes at its front end into a forward recess of the bore, said recess tapering outwardly. The bulb base is held in the cylindrical part of the rear of the bore through the cap by means of a sleeve of rubber or plastic placed over the bulb base and frictionally engaging the inner wall of the cylindrical part of the bore.

The detent means for the lamp head comprises two angularly bent leaf springs, which are frictionally held in this lamp head as their resilient bends engage the inner wall of the lamp head, while the free spring ends engage in notches on the contact pins extending from the battery housing.

Still further objects and the entire scope of applicability of the present invention will become apparent from the detailed description given hereinafter; it should be understood, however, that the detailed description and specific example, while indicating a preferred embodiment of the invention, is given by way of illustration only, since various changes and modifications within the spirit and scope of the invention will become apparent to those skilled in the art from this detailed description.

In the drawings:

Figure 1 shows a partial longitudinal section through a flashlight according to the invention with the lamp head attached, the rear portion of the flashlight housing containing the battery and the recharging means being broken away.

Figure 2 is a side view of the lamp head, and a portion of the housing in section to show the electric contact means inside the flashlight housing with the lamp base engaged thereby, the other parts of the flashlight structure being omitted.

Figure 3 is a rear view of the lamp head showing the interior thereof.

The novel flashlight comprises a housing 1 of which only the front part is shown in Fig. 1. This housing 1 contains the battery, or batteries, and the recharging means therefor (not shown). Two contact pins 2 are secured to and project from the front end of the housing 1 and serve to connect the housing to a power line when the battery or batteries are to be charged. In the normal operating condition of the flashlight, these contact pins 2 are covered by a cap-like lamp head 3 having a central bore forming a passage through this head. The front portion of this passage constitutes a flared recess 12 widening toward the forward end and adapted to receive the front end of a lens-type bulb 4. This lens-type differs from an ordinary incandescent lamp in that a lens is fused into its glass envelope. The base of this lamp 4 is surrounded by a resilient rubber or plastic sleeve 6, by means of which the base is frictionally held in a cylin-

drical portion **16** at the rear of the bore through the head **3**. The rearwardly enlarging envelope of the bulb **4** inserted into this bore from the rear of the cap **3** seats on a constriction or flange **13** provided in the bore, and the front end of the bulb **4** extends into the outwardly flaring recess **12** at the front of the cap **3**.

The lamp head **3** is removably secured or plugged on the pins **2** which are received in openings **15** of this head, whereby the rear of the head engages the front end of the housing **1**. To prevent accidental removal of the lamp head **3** from the pins **2**, detent means are provided in this head to lock the same to the pins **2**. These detent means comprise two leaf springs **10** having ends **18** adapted to grip the pins **2** (see Fig. 1). According to Fig. 3, each of the leaf springs **10** is angularly bent at its center, whereby the bends are resiliently held between the inner wall of the head **3** and webs **14** which are, in turn, between this wall and a boss **19** containing the bore, reinforcing the bore structure and suitably formed to receive the bends of these springs **10**. The free ends **18** of the springs **10** are respectively oriented towards each other and are bent to form bevel angles **22** (see Fig. 1) adapted to engage notches **11** on the contact pins **2**. The bevels **22** on the ends **18** of the springs **10** facilitate the assembling of the lamp head **3** on the contact pins **2**, because the inclined surfaces at these bevels will readily engage the notches **11**.

When the lamp head **3** is attached to the housing **1**, the end of the lamp base **5** protrudes into the front end of the housing **1**, in which electrical contact springs **8** and **9** connecting to the battery are provided. The free end of the spring contact **8** is adapted to engage a center terminal **7** of the lamp base **5** while the free end of the spring **9** is provided to resiliently contact the lamp ferrule **21** (see Fig. 2). Such construction is very suitable, because no conventional lamp socket, solder joints, contact pins etc. are required. The novel structure results in a compact and simple design for rechargeable flashlights.

We claim:

1. In a portable flashlight having a common housing for a battery, a recharger and its circuit, the combination comprising: contact pins for the recharger circuit projecting parallelly from one end of said housing, the free ends of said pins matching a female plug of an electric power line; a lamp head having the form of a cap and having at its rear end adjacent said end of said housing two parallel openings in matching relationship with said pins; a boss in said head between said pins and having a bore therethrough substantially parallel to said openings; a lamp bulb in said bore and frictionally held therein, said lamp bulb having a terminal-carrying base with its free end protruding beyond the rear of the lamp head; and a plurality of resilient contact means at said end of said housing between said pins having different electric potential, said contact means resiliently and disconnectably engaging the terminals of said lamp base when said lamp head is attached to said housing.

2. The combination according to claim 1, wherein said lamp includes a lens in the front end of its glass envelope, said front end being of smaller outer diameter than the lamp base.

3. The combination according to claim 1, wherein a sleeve of resilient material surrounds said base and frictionally engages the inner wall of said bore to yieldably hold said lamp in said boss.

4. The combination according to claim 3, wherein said bore has a constriction near its front portion forming a flange, and wherein the glass envelope of said lamp seats on said flange, thereby limiting the forward displacement of said lamp when the latter is inserted from the rear into said bore.

5. The combination according to claim 1, wherein detent springs are resiliently held in said lamp head between the inner wall thereof and said boss, and wherein said spring have free ends respectively oriented towards each other and being adapted to frictionally grip said pins and thereby secure said head to said housing.

6. The combination according to claim 5, wherein said pins have notches to be engaged by said free spring ends.

7. In a portable flashlight having a common housing for a battery and a recharging circuit, the combination which comprises: a one-piece cap having a center bore which is funnel-shaped at one side of said cap and cylindrical at the other side and two openings aside of said bore having such diameter and such a distance between them so as to receive a pair of contact prongs insertable in female plugs for a common power line; a lamp bulb having contact surfaces and being frictionally held in said cylindrical portion of said bore with a part of said lamp bulb extending into said funnel-shaped portion of said bore; contact prongs on said housing and extending into said openings; and contact prongs in a cavity of said housing resiliently and disengageably engaging said contact surfaces of said lamp bulb.

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