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ILLUMINATED BALL-POINT PEN HAVING A PRESSURE MECHANISM CONTAINING AN ILLUMINATING DEVICE

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Fig. 1

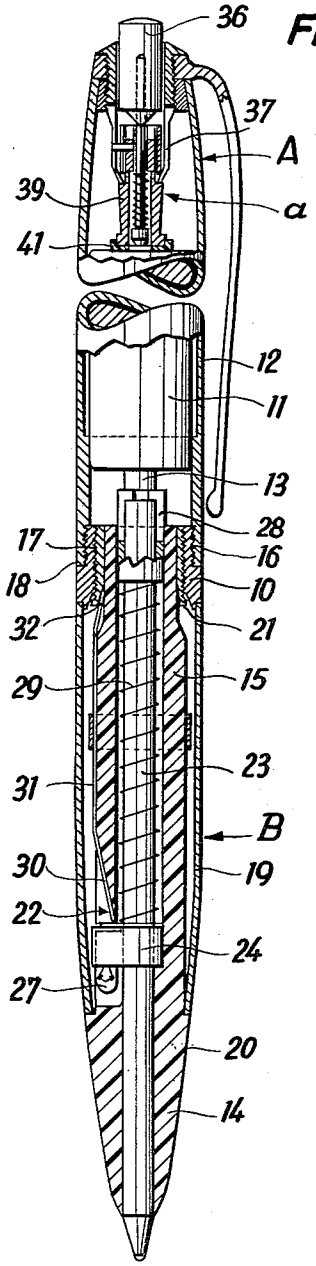


Fig. 2

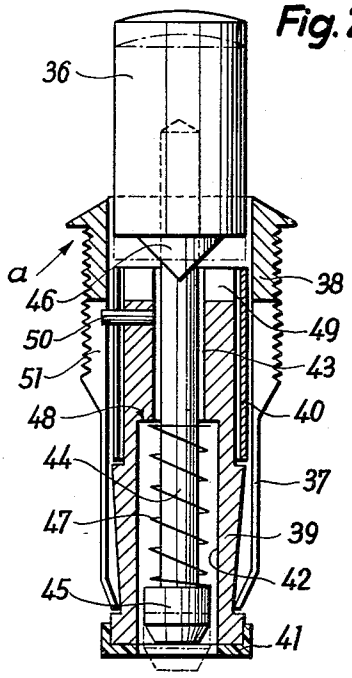


Fig. 3

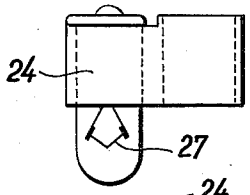
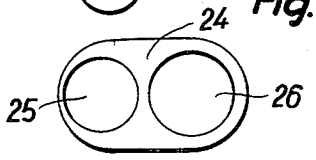


Fig. 4



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ILLUMINATED BALL-POINT PEN HAVING A PRESSURE MECHANISM CONTAINING AN ILLUMINATING DEVICE

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The invention relates to an illuminated ball-point pen having a pressure mechanism containing an illuminating device. Illuminated ball-point pens of this kind, which can also be used as small pocket lamps, are already known. On a known writing instrument of this kind, the press-button used for displacing the writing cartridge is simultaneously used for switching the illuminating device on and off. It can be depressed into two different positions wherein the cartridge emerges out of the ball-point pen tip to a varying degree and is secured in position ready for writing. In the furthest-projecting position of the cartridge, the electric bulb is switched on. The said electric bulb is disposed eccentrically in the housing of the instrument. When the cartridge is released in order that it may return into the writing instrument tip, the electric bulb is again switched off. Thus, the switching of the bulb is dependent on the cartridge position. The main purpose of the illumination is of course the illuminating of the writing surface. If it is intended to use this known writing instrument as a small pocket lamp with switched-on illumination, then it is necessary to push the cartridge out into its foremost position. It will be obvious that it can easily be damaged in the dark in this position. Furthermore, it is necessary with the known instrument, due to the only slightly eccentric position of the electric bulb, to forwardly bend over at an angle the cartridge which is required to project centrally out of the tip of the ball-point pen, so that straight normal cartridges cannot be used in this case. Finally, the position of the electric bulb also makes it necessary to use an unusually-shaped rod-type battery, i.e. a battery having an outer longitudinal groove through which the cartridge is able to extend as far as the press-button. The pressure mechanism on these known instruments appears nowadays to be out of date.

A ball-point pen which, despite the provision of an illuminating device, has a normal straight cartridge, is also known. In this case, the electric bulb is arranged centrally; it is adapted to be switched on by pressing in a press-button. In consequence of this, however, in this case also the cartridge is pushed out forwardly and, as in the case of the first-mentioned device, adopts two positions the foremost of which switches on the illumination. In this case also, the disadvantage is encountered that the projecting cartridge is liable to damage. The central position of the electric bulb, however, does not in this case appear to be really advantageous. If the cartridge is to be pushed forwardly—possibly for writing purposes with or without illumination—then the press-button will require to be pushed in. The press-button displaces the battery which carries the electric bulb securely positioned forwardly upon it with it. The cartridge now bears with its rearwardly pushed-on clamping sleeve against the glass bulb portion proper of the bulb and the cartridge is excessively stressed rearwardly by the strong recall spring. Thus, the glass of the electric bulb is in this case required to serve as a thrust bearing. Since glass is sensitive to pressure, the choice of glass as a pressure member in the pressure "linkage" system is not entirely a happy choice in respect of the working life of the bulb. This obviously provides a source of failure in the known device.

It is an object of the invention to obviate all these defects by providing a ball-point pen with an illuminating means the switching on and off of which is entirely independent of the position of the cartridge. The ball-point pen is furthermore to be manufactured with the use of known standard parts, in order that manufacturing costs may be kept low. The working operations still necessary for the adaptation of known parts to the new ball-point pen are to be effected on already-available machines without the necessity for inconvenient adjustments.

Thus, according to the invention, the switch for the electric bulb is independent of the pressure mechanism. It is disposed in the latter. It consists substantially of a switching pin disposed for limited displacement within the conical portion of the pressure mechanism. The switching pin has at its forward end a contact button and is securely anchored at its rearward stem end in the press-button against displacement and rotation; it is also loaded rearwardly of its head by a pressure spring for forward displacement. The press-button carries on its rear face a diagonally-extending wedge cam adapted to be rotated selectively into one or two different deep transverse grooves in the rear face of the conical portion. The electric bulb is disposed in a double clamp having two parallel bores the inner one of which, when the clamp is inserted in position, adopts an axial position in the housing of the ball-point pen and guides the axial cartridge. Positioned forwardly in the stem of the ball-point pen tip is a longitudinal groove the forward end of which penetrates the walls as far as the axial cartridge bore. The double clamp is inserted here from the side. From the electric bulb, on the bottom of the longitudinal groove and further outwardly on the cylindrical surface of the stem as far as the screwing nipple, there extends a contact tongue the forward end of which engages in a collar forwardly on the screwing nipple. In the neck of the conical portion of the pressure mechanism a transverse pin prevents the rotation thereof and engages in a longitudinal guide groove in the terminal locking screw of the pressure mechanism carrying the spring-tongue arms. The recall spring arranged about the cartridge bears rearwardly in known manner on the rearwardly pushed-on clamping sleeve and forwardly against the clamp carrying the electric bulb. Finally, the front face of the conical portion is covered by an insulating ring.

In the accompanying drawings, an embodiment of the ball-point pen according to the invention, with an illuminating device, is illustrated.

FIGURE 1 shows the embodiment in longitudinal section,

FIGURE 2 shows a longitudinal section through the pressure mechanism, drawn to an enlarged scale, and

FIGURES 3 and 4 show the carrier clamp for the electric bulb as a lateral view and a plan view respectively.

The ball-point pen according to the invention has a centrally divided housing the rearward portion A of which is held together with the forward portion B by a screwing nipple 10. The rearward portion contains the pressure mechanism *a* and the rod-type battery 11 pushed from the front into the metal casing 12; the head of the carbon rod 13 of the battery 11 extends forwardly. Furthermore, the clip is positioned on this portion.

The forward portion B consists essentially of a Plexiglas tip 14 prolonged rearwardly by a Plexiglas stem 15. It is provided at its rearward end with an external screwthread 16. On the latter, the screwing nipple 10, which has an external and an internal screwthread, is screwed on with its internal screwthread 17. Screwed on its external screwthread 18 is the rearward housing portion A. The stem 15 of the tip 14 is surrounded by a metal sleeve 19 centered with its forward end by a shoulder 20 externally on the tip 14 and at its rearward end by a collar 21

forwardly of the screwing nipple 10. The stem 15 of the tip 14 is furthermore formed with a longitudinal groove 22 and it is formed internally with a central bore for the cartridge 23 of the writing instrument. The said bore is sufficiently amply dimensioned in respect of its diameter that the return spring 29 surrounding the cartridge 23 still has sufficient space. The forward end of the longitudinal groove 22 penetrates into the central bore. The electric bulb holder is inserted from the side into this passage. The said holder has the form of a double clamp 24 having two juxtaposed parallel bores. The electric bulb 27 is insertted in the outer smaller bore 25; the inner larger bore 26, when the clamp is inserted, adopts an axial position in the ball-point pen and forms a guide means for the cartridge 23. Pushed on to the rearward end of the cartridge is a clamping sleeve 28 the front face of which constitutes the rearward abutment for the recall spring 29. Its forward end is positioned on the clamp 24 and prevents it from longitudinal displacement. From the clamp 24 forwardly, the axial bore through the tip 14 constitutes a guide for the cartridge 23. The appropriately bent-over forward end of a contact tongue 31 engages in the longitudinal groove 22 in the stem 15, the said contact tongue 31 establishing contact forwardly with the electric bulb 27 and rearwardly with the screwing nipple 10, its rearward end 32 which is bent outwardly at an acute angle bearing against the conical inner wall of the collar 21 on the screwing nipple 10.

The switch for the electric bulb 27 is built into the pressure mechanism *a*. The pressure mechanism per se is the known mechanism having a press-button 36 sliding in the terminal closure screw 38 carrying the spring tongue arms 37, the spring tongues of the said member 38 co-operating is known manner with the conical element 39 and the loose displacement sleeve 40 displaceable upon it.

The conical member 39 carries securely positioned on its forward end face an insulating disc 41. The latter prevents contact between the pressure mechanism and the bottom of the rod-type battery 11. Worked into the conical member 39 is a stepped longitudinal bore 42, 43. Pushed into the latter from the front is a contact pin 44 having a button 45 on its forward end. Pushed on to the stem of the contact pin 44 is a spring 47 one end of which presses against the button 45, whereas its other end presses against the inner shoulder 48 of the bore 42, 43 and tends to press the contact pin 44 out of the conical portion 39, so that it bears against the base of the battery. The shaft of the contact pin 44 is prolonged into the press-button 36 and pressed into the said press-button 36 in such a manner as to be secure against rotation and displacement, so that the press-button 36 and contact pin 44 forms a whole unit in respect of tensile forces and rotation. The pressure spring 47 therefore pulls the press-button 36 against the conical element 39. Milled on to the front face of the press-button 36, i.e. on the inner surface thereof, is a cam 46 having a wedge-shaped cross-section. The stem of the contact pin 44 passes through the said cam. The end of the conical element 39 facing the cam 46 forms an annular sleeve, since the central guide bore 43 for the stem of the contact pin 44 passes through. Milled into this end of the sleeve wall are two radial grooves 49 of different depths which intersect each other at an angle of 90°.

In order that, when the press-button 36 is rotated, the conical portion 39 shall not also not rotate, the latter has disposed on it a transverse pin 50 engaging in a longitudinal slot 51 in the walls of the terminal closure screw 38 carrying the spring tongue arms 37.

The illuminated ball-point pen according to the invention operates in the following manner:

If it is desired to write with the instrument then, by depressing the press-button 36 and therewith also the conical portion 39, the rod-type battery 11 is displaced and pushes the writing cartridge 23, under the tension of the recall

spring 29, forwardly out of the tip 14 of the ball-point pen. As this is done, the spring-tongue arms 37 engage behind the rearward shoulder on the conical element 39 and hold the cartridge securely in the position ready for writing. This mode of operation of the instrument is known and does not constitute the subject of the invention. It is now possible to write in the same way as with any normal ball-point pen. If it is desired to illuminate the writing surface, the press-button is rotated through 90° in any desired direction. The wedge-shaped cam 46 also rotates. It "climbs" out of the transverse groove of slight depth wherein it has hitherto been disposed, up over the oblique walls thereof and snaps into the other transverse groove of greater depth, due to the tensile force exerted by the pressure spring 47 on the press-button 36. The head 45 on the switching pin 44 is pushed forwardly out of the conical member 39, by the pressure of the spring 47 and for a distance equal to the difference between the depth of the two transverse grooves it then bears against the bottom of the rod-type battery 11. Current now flows from the battery 11 through the clamping sleeve 28, the cartridge 23, the double clamp 24, the electric bulb 27, the contact pin 30, 31, the screwing socket 10, the metal casing 12 of the rearward portion A of the ball-point pen, the pressure mechanism, and the switching pin 44, back to the battery. The electric bulb lights up. If, now, during the illumination of the bulb 27, further pressure is exerted on the press-button 36, the loose displacement sleeve 40 presses the spring tongue arms 37 outwardly in known manner and swivels them away from the rearward shoulder of the conical portion 39, so that the recall spring 29 draws the cartridge 23 back into the tip 14. This mode of operation is also known and does not constitute a part of the invention. Meanwhile, the electric bulb continues in the illuminated state until it is once more switched off by rotating the press-button 36 in the same manner as for switching on.

It will be apparent from this that the electric bulb is adapted to be switched on and off independently of the position of the cartridge, so that use of the ball-point pen in known manner as a small pocket lamp is easily possible.

I claim:

An illuminated ball-point pen with small pocket lamp comprising a casing with a battery therein, a writing cartridge slidably movable in the casing in retracted and writing positions relative to the casing and abutting against the battery, an electric illuminating bulb mounted in the casing, and a combined switch and cartridge actuator on and in the casing with a slidable and rotatable press-button, said actuator comprising an outer slidable member with a central bore therein and a plurality of grooves in one end and a spring-pressed central pin in the bore and with the press button thereon and a cam to cooperate with the grooves, whereby a sliding movement of the press button and pin and the slidable member will actuate only the battery and writing cartridge and when the press button is rotated and the cam enters a groove the illuminating bulb will be energized to light the bulb by movement of the central pin relative to the slidable member due to spring force on the central pin to slide the latter in contact with the battery.

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