

Ball Pen Ink Level Indicator

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Abstract:- In this Article Researchers introduced Ball Pen Ink level Indicator (BPILD). In our daily life humans are using pen to write the literature, notes etc. things and majority of pens are used in daily life. Every person like students as well as Businesses men uses ballpoint pens for writing. There are different types of pen shapes and different colored pens available in market. There are different types of pens available in market such as Ballpoint pen, fountain pen, gel pen, stylus etc. pens are used. When we all use the pen every time but at some time ink available in the Refill of pen has decreased. But user cannot check the status of ink available in refill every time, because of thick or heavy cover over the refill. When ink level is at the end, the user cannot write a single word at that time user must change the refill and after that pen may be in use. In this research we focus on that with the help of transistor switching circuit user can know the real time status of the ink level in the refill and before end of the ink in the refill user can be ready to change the refill.

Keywords:- Pen, refill, Transistor, LED, battery, connectors.

I. INTRODUCTION

Ball Pen is used in daily life for writing purpose but we cannot check ink status of the pen, there daily production and sold daily cycle is going on. Many historical and cultural novels, books, from ancient decades were significantly written using ballpoint pen inks, which contain different dyes with different sensitivity. But problem is that if document writing is going on and suddenly ink level of the pen is at the end or ink is over then user of pen must stop writing without completing the documents there will be no option to write. This problem can solve with the help of Ball Pen Ink Level Indicator. This indicator is helpful to know the status of ink in the pen also it indicates to user about the need to change the refill in the pen. With this there will be no problem to the user. To solve this problem by Bipal Kumar Sarkar and Yatin Kumar Agrwal have designed a system based on pressure sensor, microcontroller, led for ink level detection. But the design of this system is very complicated and also cost is very high. So user can't afford this type of pens. [1]

Guenther W. Wimmer, Richard S. Meissner, David L. Knierim has invented an ink level detection in printer using flexible bar connected to an actuator available in printer is suspended within the ink reservoir. When the actuator signals are discontinued the bar continues to vibrate and causes the actuator to generate signals that are

analysed to determine the level of ink in the reservoir. This system is very useful for ink level detection but this system is used in printer only, This is not applied on ball pen because size of pen is very small. [2]

Preston D. Seu. Vancouver had invented ink level detection for inkjet printer. It includes a permanent or semi-permanent inkjet pen containing small glass beads for ink reservoir and to provide backpressure to the ink. The inkjet pen walls are constructed by using optical sensors so that walls are transparent that detects changes in reflectivity in the glass beads. The glass beads change in reflectivity depending on whether or not they are saturated with ink. The change in reflectivity therefore functions as an effective out-of-ink detector. This system is very useful for ink level detection but this system is used in printer only, This is not applied on ball pen because size of pen is very small. [3]

In inkjet printers, it becomes possible to precisely estimate a remaining ink level in detailed scales with a low-cost and simple structure using a sensor. Specifically, a relatively inexpensive sensor that can examine whether the remaining ink level is below a predetermined value or not is employed in combination with counter (C2) that retains information about ink consumption in printing and other operations. When the sensor has detected an ink level beyond the predetermined value or the presence of juice, and the counter (2) exceeds the threshold value (12) corresponding to the ink-out level (N), the remaining ink level is increased to correct the counter error. This system is very useful for ink level detection but this system is used in printer only, This is not applied on ball pen because size of pen is very small. [4]

To solve all these problems and difficulties we are focusing on the same problem that is user will aware before refill reach up to its end using the transistor switching. In our research work we develop "Automatic ink level Indicator pen" which consists of two LEDs light mounted on pen. Once green LED light is turned ON for some time period, this LED indicates refill is full or Maximum Ink available in Refill, When user starts to write and small amount of ink decreases then blinking of green LED will stop. Now only Red LED will continually blink till the lower level of ink. Once ink decreases at below 10% and reach at minimum level then the transistor switch to turn OFF which will turn off Red LED, this off status of Red LED indicates minimum ink is present in Refill. Due to which user will aware about the refill status which is a type of indicator to display the status of refill inside the pen.

II. BLOCK DIAGRAM OF BALL PEN INK LEVEL INDICATOR(BPILI)

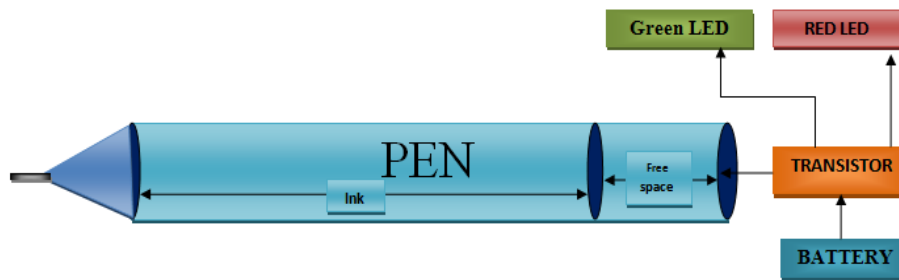


Fig. 1: Block diagram of Ball Pen Ink level Indicator

Fig. 1 is a Block diagram of Automatic Ball Pen Ink level indicator. It comprises of pen, Transistor, battery, two LED light. This shows the indication of low level ink status to the user with the assistance of LED light. Here pen having inside 1st strips which indicated link level fill already in refill and 2nd strips indicate free space available in refill. The transistor work as switch and give the signal to LEDs which indicate status of ink inside the refill. At that point only user's work won't stop but will continue up to it slow because user informed before end of ink instead of complete empty ink refill status, at the moment user will take appropriate action on this situation.

III. CIRCUIT DIAGRAM OF BALL PEN INK LEVEL INDICATOR (BPILI)

Fig. 2 is a circuit diagram of Automatic Ball Pen Ink level indicator. In this circuit diagram ball pen, transistor, battery, LEDs and refill are used. Here this pen is same as that of normal pen but having LED mounted there to inform the ink level status to the user. The two conductive wires are connected to base of transistors and then these wires are placed inside the refill, which senses the conductivity of ink inside the

refill and pass to the transistor. A tiny low battery is used to convey power to the transistor and LED. When ink level is full then automatically Green LED turn ON then user will know that refill is full. But at same time red LED is also ON. But when ink level decreases the GREEN led turn OFF first that indicate as an ink available in pen is not full. When the ink reach at level 2 the transistor will turn off and then Red LED light Turn OFF automatically. Once Red LED light Turn OFF user will know that, he has to be changed refill after some work. During this way present innovation solves user problem regarding refill replacement of any type pen. This idea will improve the pen life.

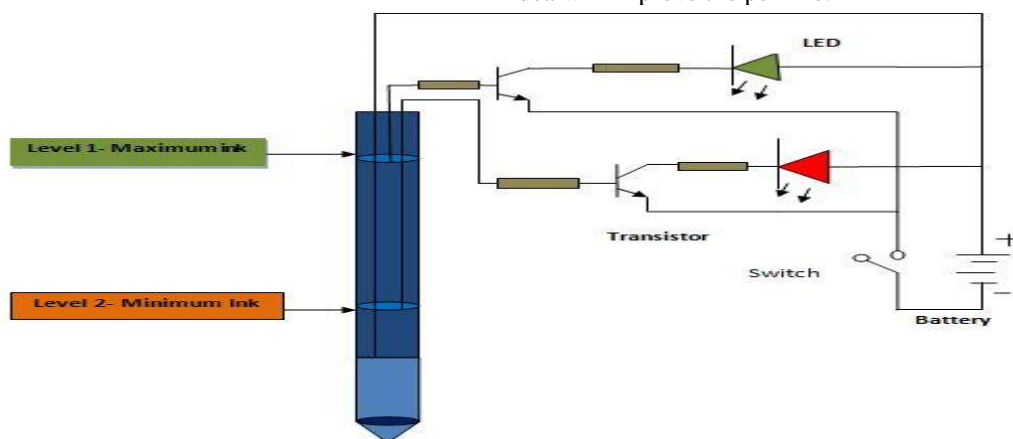


Fig. 2: Circuit diagram of Automatic Ball Pen Ink level indicator

IV. WORK FLOW DIAGRAM OF BALL PEN INK LEVEL INDICATOR

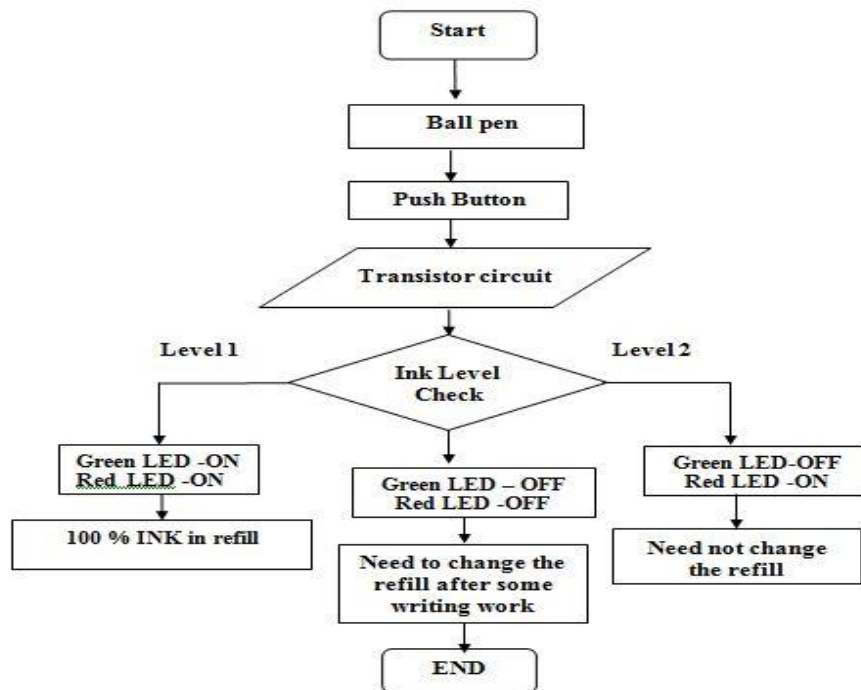


Fig. 3: Flowchart for Working of Ball Pen Ink level indicator

Fig:- 3 The Working process of smart ink level indicator pen. In this flow diagram check given condition if condition is true i.e.ink level in refill is high so by default Green LED turns ON. Otherwise ink in refill reach below level 2 then red LED will turn OFF this LED indicates that it’s time to change the refill.

V. ADVANTAGES

- BPILI can be useful in education, medical, social fields to identify the ink status of ball pen which saves human efforts.
- BPILI is not so expensive.
- BPILI is easy to use.
- Life of pen will extend.

VI. CONCLUSION

ABPILI provides helpful features to the humans. This research has been completed for the peoples to indicate the ink status of the refill inside the pen in which ink level is started decreasing user will aware about the ink level and come to know that he have to change the refill. Thus people don’t need to open pen and to check the status of refill. A ABPILI introduced along with indicators (LED light) to indicate the middle and end status of refill inside pen using percentile indication. By using this type of pens user don’t have to carry extra refills or ink bottle with him. Before end of ink user can

change the refill inside the pen. The ABPILI is the research which is implanted and peoples can increase the lie of pen.

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