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A REVIEW ON EVOLUTION OF LIGHT

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ABSTRACT

There was a gradual change seen in the development of light bulbs from the incandescent to the LEDs. With the advancement in the technology various changes was observed and finally it lead to the betterment of the society. Now we have the best efficiency light bulbs which could keep away from darkness and providing a way towards more sustainable future. This revolution has paved a way for the issues like radiating light poverty and promoting connected lighting.

KEYWORDS: Efficiency, Illumination, Conductivity, Intensity, Operating Voltage.

INTRODUCTION

Illumination is the action of supplying or brightening with light or the resulting state. In practice the tungsten halogen lamp is supplied with power through a solid state dimmer which acts to progressively lower the operating voltage and thereby reduce the intensity of illumination [1-3, 5-6, 6-11, 14, 16-22]. The invention of fluorescent lighting system companies a high efficiency and long life induces a gas filled lamp comprising a glass or quartz tube without a phosphor coating on the inside surface of the lamp. A diffuser plate or mirror externally to convert ultra violet radiation emitted by lamp [2-6, 8-11, 14, 16-22]. The light that we get from the light bulbs is due to the resistance. In light bulb, the electricity flowing through the filament or tiny wires inside the bulb causes them to white hot. If all the oxygen were not removed from inside the bulb the wires would burn up [1-3, 8-9, 17-21]. Efficiency is a measure of how much work or energy is consumed in a process. The design of fluorescent igniting fixture led to increase the overall efficiency and low maintenance expense, also various forms of the improved compact. Fluorescent lighting apparatus serve to improve the efficiency and to improve energy. Economy [2, 5-6, 8-9, 22, 25]. Brightness is the quality or the state of giving out or reflecting light. The use of LED in this way allows for altering the colour of the fluorescent. Lighting and enhancing the brightness of the fluorescent lighting [7-10, 12-18, 20-22, 25]. Conductivity is the rate at which heat passes through the specified material, expressed as the amount of heat that flows per unit time through a unit area with a temperature gradient of one degree per unit resistance.

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In light bulb argon's high molecular weight and low thermal conductivity retards the tungsten evaporation and insulates the filament there by allowing for high temperature [3, 7-9, 14, 18]. Luminous efficiency of all the tested lamps stags approximately constant with the dimming until about 57% of input power, therefore it decreases drastically. In the wireless LED sreet lighting system, usages of high efficiency (90%). LED will reduce the energy loss. The average input power is found to be 87W while the output is 80W [9, 15, 19, 21]. To replace traditional lighting equipments, LED lighting equipments of high output power are developing rapidly in recent year [19, 21, 25]. At startup, tungsten filaments are cool that the initial "Induce current" is 10 times greater than operating current leading to strong magnetic forces between coils of the filament [2-8, 18-19, 21]. CFLs emits white light mini directionally, while combining low power consumption, long lamp lives, and low maintenance requirements similar to LEDs. Ballast lighting system has a maximum active power consumption of approximately 72W. Smaller active power consumption and less heat losses for the same light flow compared to the classic incandescent lamp [11-15, 17-21, 23, 25]. High irradiance from simulator is obtained while employing elevated supply voltage to tungsten halogen lamp and high pulsating voltage to LEDs. This new approach leads to high irradiance hot previously obtained from tungsten lamps and LEDs [17-18.] LEDs inherit other important advantage including lifetime measured in tens of thousands of hours ruggedness, environmental friendliness (no mercury) compact sizes, low operating voltage and cool operation. Determination of cathode fall voltage in fluroscent lamps by measurement of operating voltage [3, 9, 19, 22].

LITERATURE SURVEY

The invention lead to a reliable, long busting source of light. This has been based upon the technology of using a lower current electricity, a small carbonised lilament and an improved vacuum inside the globe to develop a bulb [1]. In a cantilever type fluorescent lighting fixture, the combination of an eloengate rigid head end plate including a ballast chamber extending longitudinally so that the overall efficiency of the bulb was increased as well as lower the cost of maintenance and keeping the cost of manufacture same [2]. The tungsten halogen bulb had been supported by a convex reflecter. There was a cylindrical chimney provided by a socket for supporting the bulb. Tensile Wires were present at the lower end of reflector to give a protective cage to carry the hot lamhead safely [3]. An incandescent mixture was assembled with a ballast and a triple bend lamp for use. There was also a second housing which includes a glow switch and capacity which was attached to the lamp [4]. Perfect illumination was obtained for a selective area with the help of single. This light source uses silver Reflectors to provide reflection apparatus [5]. The High efficiency was provide by uniform white light illuminate. This constitute a gas filled lamp with a diffuser plate including a phosphor which converted ultraviolet radiation to uniform white illuminate with efficiency [6]. The LED Circuit board fully embedded in a resist material where thermally conductive particles were poured into the material which helped to conduct excess heat to the outer environment. In this Way lamp with LED was placed in housing [7]. The basic electrical and optical characteristics of as an appropriate exemplar for use in teching introductory and magnetism was describe. Variants of the incandescent bulb are also addressed [8]. The LEDs surpassed incandescent and halogen bulbs in terms of their efficient generating 10-100 lm/led. The demorstction of performance and reliability for high-coloured and white LEDs are shown. This created a difference between a high power LED and an indicated LED [9]. A fluorescent tube contained a fluorescent material and an ultraviolet LED substrate placed in the tubular body of the fluorescent. Their

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substrate had different 24 LED devices through which an electric power was supplied. This tube was used for illumination [10]. A bulb was enclosed by a cold cathode fluorescent lamp for the purpose of incandescent fixture. Several contact were made to the CFL with the pins of the end caps through various connection [11]. In a Light bulb atleast one LED is mounted which provided connection to the power and for reflection power source and for reflection of light ray, a reflection is positioned in the light bulb [12]. There is a combination of LEDs with a fluorescent lamp for receuting an LED which would influence the colour of the fluorescent light. Their include a LED which was attached to the rear of the tube. [13]Move than one-fifth of us electricity is used to power articiallighting. Ligth emitting diodes based on group III /nitride semi-conductors are foringing to about a revolution in energy efficient lighting. [14]A trend for fluorescent lamp dimming control is seen to be the important part of artificial light scheme. The. . factors included. electrical. characteristics, . photometric distribution of lighting as well as quality of visual environment [15].

Monochromatic amber-emitting LED was reralised with high efficiency which shows the existence of a facile optical structure. A long wave pass filter in used with a powder based phosphor converted LED [16]. The characteristation of solar cell is obtained in a pulse mode which was done under natural sunlight. There were various features of lamp and halogen lamps. Electrical parameter were identifical from the IV curves [17]. LED lighting with high power provided the acceleration of the growth rate of Lactcasatira Plant. There was incredible growth seen when it was treated under the high power LED as compared to the normal solar variance [18]. The dimming Technique are the backbones for innovation in LEDs which provided best efficiency in the case of LED street lighting. Transformer which were serially connected were used to Push LED strings for providing galvanic isolation [19]. With the advancement in LED technology due to its high efficiency with better illumination create a success in the LED markets which encouraged more profits to encouraged more profit to the manufactures. As a result it incentizes researches and leading to a new generation of lighting product [20]. The invention of smart LED lighting system lead to great extent in terms of efficiency, stabilityetc. These are contolled by Android apps via smartphones. This can be also applicable to other home appliances and can be maintened easily by smartphones [21]. CFL AND LEDs have captured the market due to their lougavity and energy efficialdesign.

The energy consumption is reduced maintaining the productivity numerous changes in material of have been lamps observed in these recent years [22]. An awareness is created among the human being for the excessive use of compact fluorosecent lamps as it lead to some disartrous and hazardous result on the ecosystem. It is well said that every blessing is accompanied with evil blessing [23]. Mercury, being the essential part of CFLs is extracted after they reach the end of their useful life. Mercury when released to atmosphere causes air and water pollution. To avoid this CFLs are discanded in the trash to avoid release of mercury in the atmosphere [24]. To order to monitor and control the LED strreatlight, wireless sensor metwork is prepared allowing substantial energy saving through different algorithm. This is applicable to different places likes streets, station, and building [25].

WORKING PRINCIPLE

A P-N junction can convert absorbed light energy into a proportional electric current. The same process is reversed here (i. e. the P-N junction emits light when electrical energy is applied to it). This phenomenon is generally called electroluminescence, which can be defined as the emission of light from a semiconductor under the influence of an electric field. The charge carriers

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recombine in a forward-biased P-N junction as the electrons cross from the N-region and recombine with the holes existing in the P-region. Thus the energy level of the holes is less than the energy levels of the electrons. Some portion of the energy must be dissipated to recombine the electrons and the holes. This energy is emitted in the form of heat and light. The electrons dissipate energy in the form of heat for silicon and germanium diodes but in gallium arsenide phosphide (GaAsP) and gallium phosphide(GaP) semiconductors, the electrons dissipate energy by emitting photons. If the semiconductor is translucent, the junction becomes the source of light as it is emitted, thus becoming a light-emitting diode. However, when the junction is reverse biased, the LED produces no light and if the potential is great enough, the device is damaged.

PAST RESEARCH

'Electric Are Lamp' the first invention by Humphry Davy in 1802, was probably the beginning of evolution of light. This invention didn't find any scope for the practical purposes. The next notable invention was done by Warren De La, a British scientist in 1840, in which he used a filament made up of platinum and an electric current was passed through the filament in a vacuum tube. Another important, notable invention was done by Joseph Wilson Swan, in which he used carbonized paper filament. The filament was enclosed in an evaluated bulb made up of glass.

The expected lifetime was not up to the mark. A treated cotton thread was developed by him , which made the bulb long lasting . A patent was published by Henry Woodward, a Toronto Electrician, which showed how their lamps were built using carbon rods of various shapes and sizes. These rods were fixed between electrodes in cylinder that were filled with nitrogen. This patent was bought by Edison in the year of 1879.

PRESENT RESEARCH

1. An International team of research created the first on chip, visible light source. This uses graphene as a filament. This graphene was termed as a "wonder material". When this graphene are attached to electrode, the temperature is increased up to 2800K automatically which allows it to emit light . The generation of light which was found on the surface of a chip developed photonic circuit , that may carry source of information through light.
2. Inorganic LEDs are light-emitting diodes (LEDs) made from a crystalline semiconductor. The optical emission wavelength can be selected by varying material composition. Example active regions include germanium, gallium arsenide, gallium nitride and indium phosphide. Inorganic LEDS are prized for their low power consumption and are rapidly replacing conventional incandescent light bulbs.

FUTURE SCOPE

These incandescent bulbs are not advantageous in all respect due to power loss which is a great concern. Only 10% of electrical power is utilized and finally converted into light. The rest of the energy is lost due to excess heat. In spite of these disadvantages, the bulb are used in day to day life because of some advantages mentioned below :-

- Wide, low-cost availability
- Easy incorporation into electrical systems
- Adaptable for small systems
- Low voltage operation, such as in battery powered devices
- Wide shape and size availability

Unfortunately for the incandescent bulb, legislation in many countries, including the US, has mandated phasing it out for more energy-efficient options such as compact fluorescent lamps and LED lamps. There has been much

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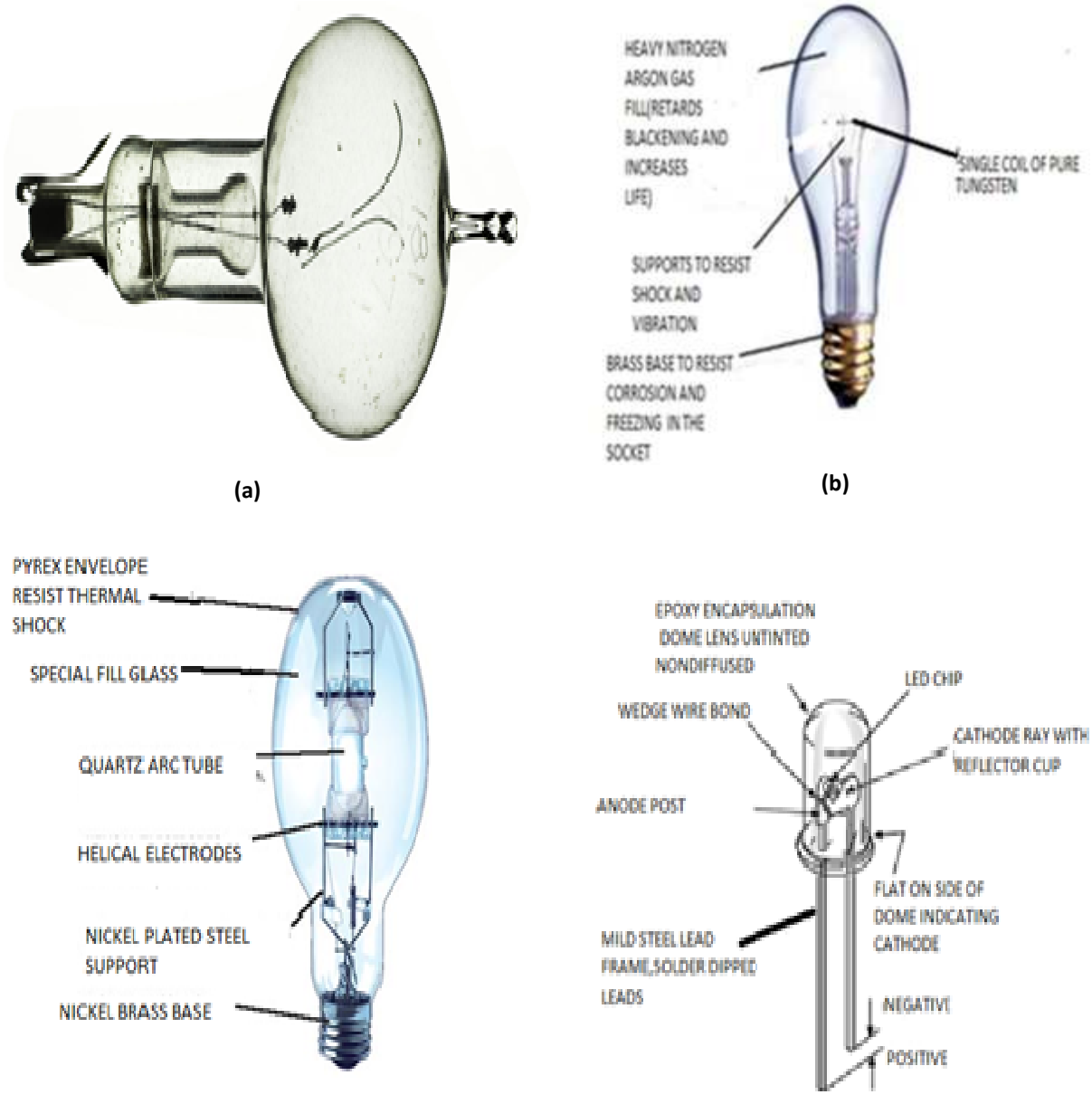
resistance, however, to these policies owing to the low cost of incandescent bulbs, the instant availability of light and concerns of mercury contamination with CFLs.



(a) **(b)** **(c)** **(d)**

Figure 1.(a): Original carbon-filament bulb from Thomas Edison, (b): fluorescent lamp, (c):compact fluorescent lamp, (d):LED as a detector

CONCLUSION

In this paper we have analysed how the changes in light bulbs have occurred from the 19th century till date. Various forms of technologies and their applications have been observed. The newer technology have improved the lifestyle of common people. In the 19th century filament were used in the light bulbs which consumed more power and provided low efficiency, but the scenario is totally changed with the inventions of LEDs. This paper presented the different types of technologies used in the development of light bulbs from the beginning of the invention of the light bulb till now. This is not the end, the future scope of lighting is very bright which is very important to the society in all respect.

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