



A DEVICE TO STORE RENEWABLE ENERGY FOR ELECTRICAL APPLICATIONS

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October 18, 2022

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Field of Invention

Present innovation deals with a design of a device to increase the renewable energy sources. The expected energy from the speed breakers is to be used to activate the small home appliances. The device with piezoelectric plates is placed in the speed breakers. Once the vehicles pass by the breakers, a vibration is produced. The produced vibration from any type of vehicles is converted to electric energy and a capacitor is used to store the energy. This energy is to be used for small appliances at present. In future, the number of pressure sensor (piezo plate) can be increased that will enable to store more amount of energy that can be applied for large applications. This device is required as it is a type of renewable and non harmful to the environment.

Background of the invention and the prior art

Piezoelectric road integrated technology is a new energy evolution and hence piezoelectric awareness and expertise in this sector are very limited. The power metrics provided by vendors does not provide additional technical details. The vendors were compared using vibration-based factor only. Other technical factors were not analyses in terms of piezoelectric geometry, structure, and thickness that are mentioned in. This is common having not to reveal a full technical report of this technology to preserve innovation, invention rights and securities effective business strategies. Implementing piezoelectric road technology on field requires a standard specification in the execution process which has not been established. This is important as to use appropriate management and method to prevent manipulating with road infrastructure and minimize traffic congestion.

Pattern numbered JPH01175273A by OGURA KOJI 0 invention is to enable the excellent directivity wave transmission and improve the signal-to-noise ratio of a wave receiver, by

connecting the minus electrode of a main piezoelectric layer with the inner electrode of a sub piezoelectric layer to use them as a common electrode and making polarizations of each piezoelectric layer in one direction to the common electrode.

The invention disclosed in Patent Numbered AU2020102628A4 by LI YATIAN et al, is a low frequency piezoelectric underwater transducer based on fold back structure. The invention relates to an underwater transducer, in particular to a low frequency piezoelectric underwater transducer based on fold-back stacks, which belongs to the field of electro acoustic sensor. It is one type of electro acoustic devices, which finishes the transformation between acoustic energy and electrical energy in water to be used as low frequency projector and hydrophone. So far, the sound waves are the most effective information carrier for underwater detection, and the underwater transducer is an indispensable key device. With the further development of modern sonar technology and the continuous improvement of application requirements, the underwater transducer with low frequency and small size is urgently needed. The relevant research has become the important developing trend. Currently, the most widely used low frequency transducers include: giant magnetostrictive underwater transducer, flex tensional transducer and its improved versions, flexural transducer, free-flooded ring transducer and so on.

HAN HYO SEUNG et al., on 2021-01-14 Published as US2021010886A1 discloses a capacitive pressure sensor that includes a flexible substrate, a first electrode and a second electrode disposed on one surface of the flexible substrate so as to be spaced apart from each other and located to face each other when the flexible substrate is folded, a dielectric layer interposed between the first electrode and the second electrode, and a signal processing unit disposed on one surface of the flexible substrate and converting a capacitance, which changes as a thickness of the dielectric layer changes by external pressure in a state in which the flexible substrate is folded, into an electrical signal.

US10889387B1 on 2021-01-12 by PalaniappanElangovan disclosed is an aircraft lighting system disposed in an environment of an aircraft. The system includes a housing. The system includes

an illumination element disposed within the housing. The system includes energy generation circuitry configured to generate electricity from the environment. The system includes switching circuitry including a driver operable to control illumination of the illumination element and operated with a driver voltage. The system includes energy harvesting circuitry including a regulator configured to draw energy from the energy generation circuitry and output a regulator voltage at the driver voltage.

Patent published as CN112170325A US2021001381A on 2021-01-07 by QiuXiaoming explains an ultrasonic water jet apparatus includes a water accumulation part in which the water supplied from a water supply source is temporarily accumulated, a jet port that jets the water accumulated in the water accumulation part, and a piezoelectric vibration plate including a dome part that is disposed opposed to the jet port in the water accumulation part and propagates the ultrasonic vibration to the water accumulated in the water accumulation part, a flange part that projects outward in the radial direction from a peripheral edge of the dome part, and an annular plate that projects outward in the radial direction from a peripheral edge of the flange part.

Systems and methods are provided for detecting an enclosure alignment anomaly. Pressure data of a set period can be obtained from one or more piezoelectric sensors. The one or more piezoelectric sensors are installed in between an enclosure and a fixture of an autonomous vehicle. The pressure data of the set period can be processed over a period of time. One or more trends can be identified based on the processed pressure data as published in CN112179266A:US2021003388A1 on 2021-01-07 by Diehl Peter G et al..

The invention in JP2021005783A;US2020411746A1 by Kitahara Yukio et al., on 2019-06-26 includes a vibration element includes: a base; a first arm continuous with the base; a second arm that is continuous with the base and is adjacent to the first arm; a first electrode disposed on the first arm, the second arm, and the base, a first piezoelectric layer that has a first polarity and that is disposed on the first electrode on the first arm; a second piezoelectric layer that has a second polarity different from the first polarity and that is disposed on the first electrode on the second

arm; an insulating layer disposed on the first electrode on the base; and a second electrode disposed on the first piezoelectric layer, the second piezoelectric layer, and the insulating layer.

Brief Description of the Drawings

The description of the illustrative embodiments is to be read in conjunction with the accompanying drawings, wherein

Figure 1 illustrates a general block diagram of proposed mechanism.

Figure 2 illustrate the working module of the renewable energy system

Figure 3 project the simple prototype model of proposed system when placed in the speed

Figure 4 explain the schematic view of piezoelectric sensor that can be used in breakers.

Figure 5 depicts the electric model of the proposed system of renewable energy system that can be applied for small electrical applications.

Figure 6 gives the detailed description of the overall schematic view of the proposed system that can be applied for electrical devices.

Detailed Description of the Drawings

The proposed invention starts with the idea of generating electrical signal or energy from the mechanical force applied to the surface. The mechanism of converting the mechanical force into electrical energy by the effect of piezoelectric phenomenon is explained clearly in Figure. The basic working module of applying mechanical energy by any vehicle on the speed breakers are given as a simple model in Figure 2. The effect of piezo electric (converting mechanical to electrical) is given as an example in Figure3 which clearly depicts the usage of plate in the breakers. The entire mechanism of converting the mechanical force to electrical energy particularly as a renewable form by the help of vehicles in speed breakers are given in the Figure 4 (electrical model) and Figure.6.

Description of the Schematic diagrams of the proposed device

Any vehicles that are passed over the speed breakers apply a force on the surface. The applied force is wasted and it is not utilized. With the help of piezo electric effect, it is proposed to convert the mechanical force to electrical energy as in Figure 2 and 3. The converted electrical energy is stored and used by any electrical devices. It is designed as a prototype. In future the same mechanism can be extended for high power applications too. The schematic view is shown in Figure.3 and 4. The overall flowchart of the work is proposed in Figure. I. Figure 6 gives the overall schematic diagram of the proposed energy system.

Detailed Description of the invention

The design consists of a thin box around the piezoelectric material, which is placed underneath the asphalt layer. As the truck pass over the plates embedded in asphalt layer, they compress a tank filled of hydraulic fluid under the road, which in turn creates a series of pumping action that turns a generator to produce electricity. When a car drives over the box, it takes the vertical force and compresses the piezoelectric material thereby generating electricity. The energy 80kWph kilometer of road for traffic-can be stored in nearby battery or super capacitor, depending upon the application or sent directly to street lights and other road side devices The energy being converted into electricity through piezoelectric effect is coming from the motion of vehicles which will otherwise be wasted by heat when the roads deforms under the weight of the car. The layer of piezoelectric material is stiffer than the road material it replaces, so it even saves a tiny amount of energy Engineers have created new type of road which is capable of turning the vibrations caused by car into electricity. While the concept is not new, the application is novelty The piezoelectric generators harvest the vibration energy and save it in roadside batteries that can be used by people. Accordingly I truck can generate 2000 volts which could already be used to power the traffic lights or street lamps. This process is also known as parasitic energy harvesting Under the upper asphalt there is the layer of piezoelectric crystals that produces electricity when suppressed, The same technology can be implemented to railways and runways. It aims to capture energy when vehicles are slowing down in which cars or trucks would drive over a mat that would be installed on top of the road, on a highway off-ramp, or near a toll booth, saving

wear and tear on the car brakes and transforming some of the slowing vehicle's motion into electricity. The mat uses mechanical or hydraulic cells to generate electricity and can be customized for cars or cargo truck traffic. This is because the system is designed to be installed in locations where vehicles are required to reduce speed, such as tall plazas, rest areas and drive thrush, meaning the system only makes use of vehicle energy that would he required to slow downs. A kilometer of "electric road" could generate enough power for 40 houses, and progress in the technology could generate enough electricity to feed the national power grid. Private companies were competing in this sector but recently governments of developed countries are also taking notice to the developments in turning traffic rush into electricity and are funding many projects. Here we are using it in speed breakers.

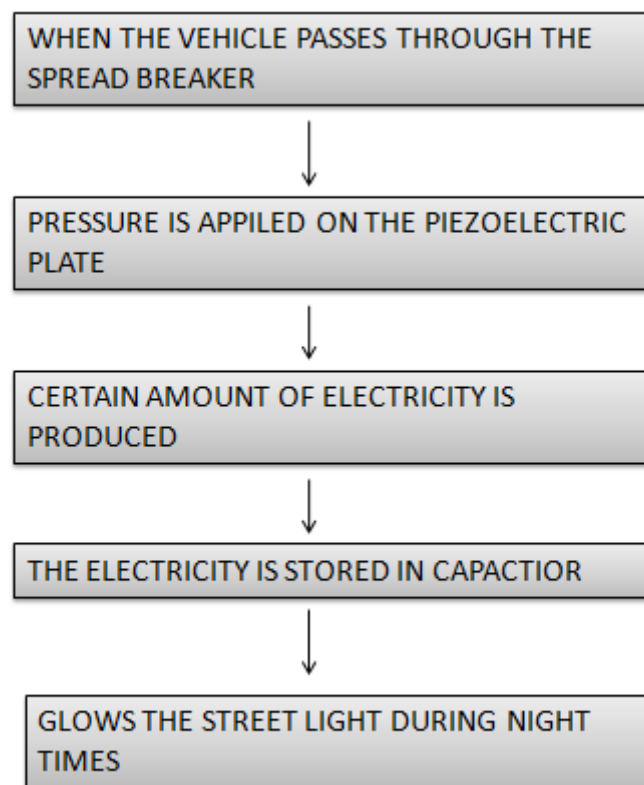


Figure.1 General Block diagram of the proposed mechanism

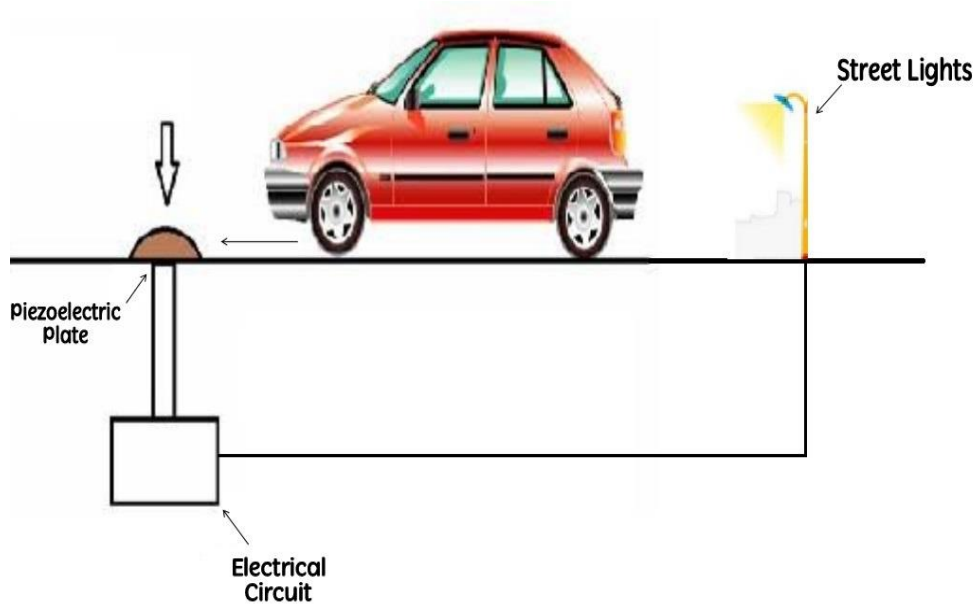
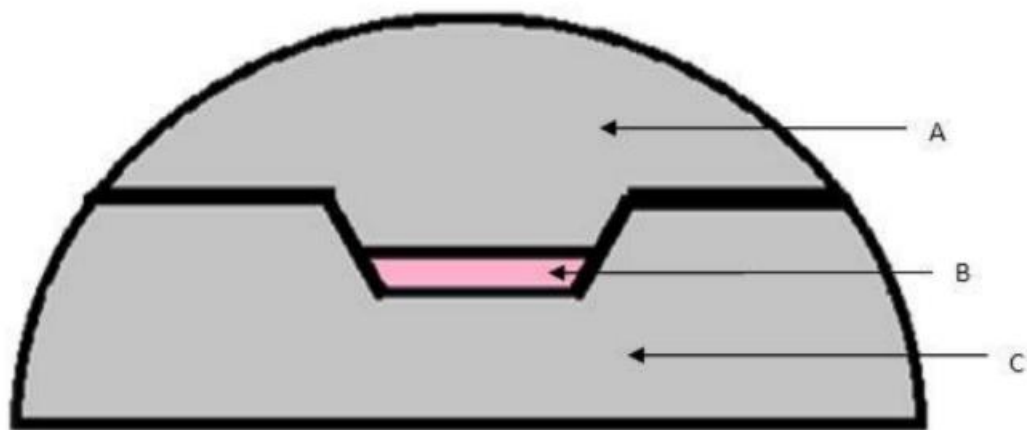


Figure.2 Simple Working module of the proposed mechanism



- A. Upper detachable part of speed breaker
- B. Piezoelectric material (generator)
- C. Lower fixed part of speed breaker

Figure.3 Placing of plate in Speed breaker

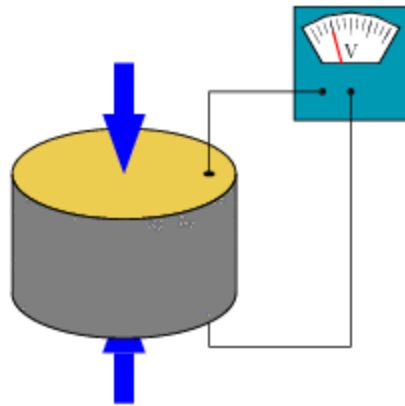


Figure.4 Simple model on piezoelectric sensor

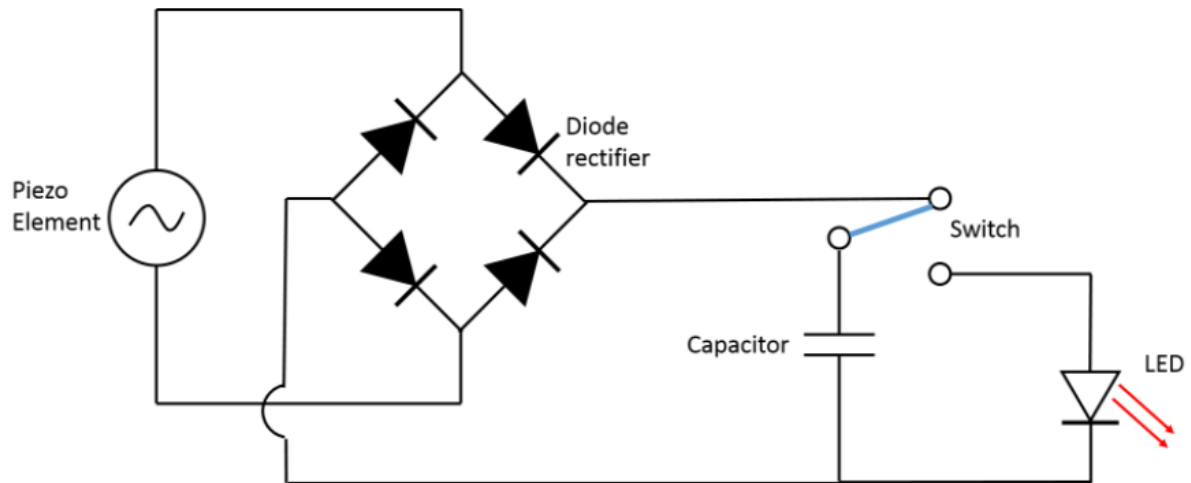


Figure.5 Electric model of the proposed method

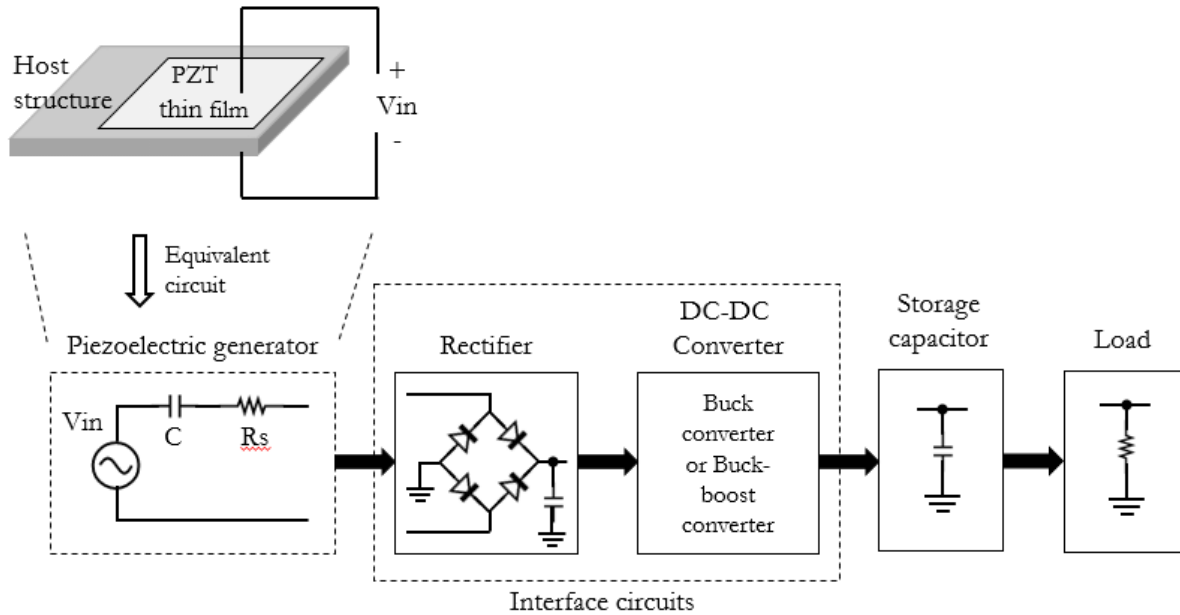


Figure.6 Overall block diagram of the proposed mechanism

Abstract

In Present condition the shortage of electricity is the big problem for industrial growth as well as rural developing. As it is known that natural resources will finish one day. That's why researchers are trying to introduce substitute energy sources from nature. That must be green and not harmful for the environment Energy harvesting is defined as capturing minute amounts of energy from one or more of the surrounding energy sources. Human beings have already started to use energy harvesting technology in the form of windmill, geothermal and solar energy. The energy from natural sources, termed as renewable energy. Shortage of electricity has its effects on India's Developing Growth. To solve such types of problem strong electricity generating techniques need to be developed with the help of wasting human energy for our better future. In electrical power is generated as Non-Conventional method by simply driving cars on speed breaker. Non-Conventional energy system is very essential at this time to our nation. Mechanical Energy (Non-Conventional energy) into the Electrical Energy by driving vehicle. Due to this a lot of energy resources have been exhausted and wasted. Proposal for the utilization vehicle motion is very much relevant and important for highly populated countries like India and China where millions of traffic are found on roads that move around the Clock. When vehicles pass through Speed Breakers a certain amount of pressure is applied on the piezoelectric plate. When

the pressure applied on the plate, it is converted to its electric energy and the electrical energy is stored in a capacitor. Stored electric energy is used to glow the street light during night time. In future, Piezoelectricity might become a very useful source in reducing the energy crisis to a great extent. Some of the fields in which we can use piezoelectricity are the street lights, which are sourced by the pressure exerted by the moving vehicles onto the piezoelectric material installed for lighting. It can also be used to power the sign boards. The busy roads and airports can also be the specified areas for the installation for the piezoelectric material for harnessing the electrical energy for various uses.