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PIEZO- AIDED FOOTSTEP POWER GENERATOR

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Abstract: Just think how much an average person would walk, a person of 80 would have walked 216,262,500 steps throughout life. Then think of billions of peoples. Also think if energy produced is sufficient and reachable to entire mankind. what if you convert this foot step into a useful source rather than wasting it? It would be non-conventional energy for performing work or just light up the street. It would meet the small need for energy for the growing population. This energyof footstep can be used with help of footstep power generator [by using piezoelectric sensors].
Keywords: Energy from footstep, piezoelectric sensors, kinetic mechanical energy into electric energy,generate electricity

I. INTRODUCTION

When the flooring or platform is engineered with piezoelectric technology, the pressure or force due to step is captured by floor sensors, and voltage is generated by the piezoelectric circuit. The sensors are placed in such an arrangement to generate the maximumoutput voltage. It is further given a monitoring circuit. Itis further given a monitoring circuit that could monitor the voltage produce. It also displays the current generated on an LCD. The energy produced could be stored with help of a battery or can be used for lighting up the street around or even charge the phone. Here mechanical power transformed into electrical power as the pressure is exerted on sensors Hence this converts kinetic mechanical energy into electric energy. In public locations like schools, bus stops, theatres, train stations, malls, and gyms, among others, this project is quite beneficial. Where large people walk and hence produce energy for lighting those palaces themselves. It could be greatly useful and widely used. We hope it would somewhere help to meet the need for electricity. Itcan be used anywhere and at any time. Energy can be stored and used further for any primitive uses.

II. LITERATURE SURVEY

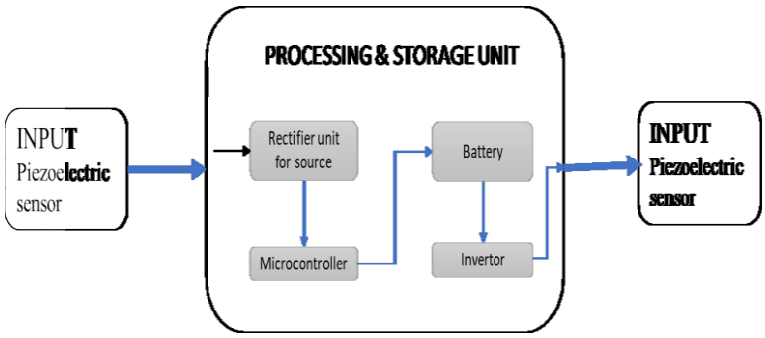
1. **Piezoelectric Sensors and ActuatorsAuthors:** Stefan Johann Rupitsch
It explains the emerging uses for piezoelectric materials. Complete reference providing information on the basics and uses of actuators. features piezoelectric device modelling strategies.
2. **Piezoelectric Transducers and Applications Editor:** Antonio Arnau Vives
It provides a road map for the current state of the artin this challenging and interdisciplinary field. This book meets the critical demand for a single source of information on piezoelectric units and the extraordinary range of current and emerging uses.
3. American Navy researchers began studying piezoelectric crystals in December 1929. Their primary focus is on the crystals' dimensions. This search demonstrated that the output is significantlyvaried by changing the size and orientation of the crystal.
4. Remote sensing of various equipment and machinery operating parameters is needed for manyindustrial and military operations in places where conventional power sources might not be available and where long stretches of unsupervised operation are necessary. Different piezoelectric techniques in wireless sensing were examined and tested in 2000 for enhancing the power source through this.

III. NEED

Energy has been needed and utilized by man at an increasing rate since the earth's creation. These days, themost common and mostly used kind of energy is electricity. Its importance and need are peaks nowadays. At the same time, there is electricity demand across the world with no electricity to light homes and streets. Mostthings need electricity to work.

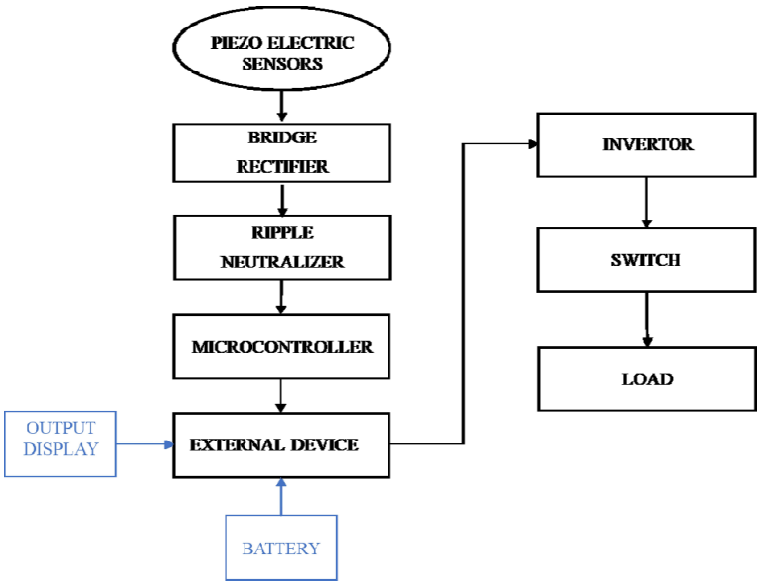
We are forced to create more sources for electricity By converting basic energy sources like nuclear, coal, and other natural sources, we can produce electricity. But there are inefficient, harmful, and non-renewable. For instance, trash from atomic power plants must be handled carefully, as do fossil fuels, which contaminate the environment. Therefore, we require a substitute. we should move towards a more efficient, easy, safe, andbetter form of solution for energy issues. Already we making electricity from other sources of energy. one among them could be footstep power generator that could produce electricity by our footstep pressure. we are making energy from other sources like solar, then why not from our footsteps. This is efficient, easy, conservative, pollution less, muchcheaper (only installation charge), renewable energy, with no need for fuel input, can store electricity, long life, self-power generation, no wear tear and the advantages could move on. let's think that we will put this up in our college, nearly 100s would move walking around nearly 10 times a day in a single lane, a single complete footstep can generate 2-3 volts with help of this. Then think how much power could be generated if we could put this up throughout thelane for 100 to walk several footsteps. It would be enough to provide electricity completely for at least (or more) a classroom at least for a day. To increase the voltage, we can use a boost converter circuit to boost thevoltage to 12 volts. Of course, it is a sort of one-time investment with long-term benefits and goodness (as mentioned above). It would put you in an alternative way of electricity and also make you contribute for earth. touchpads. This was discovered in 1880 by Jacques and Pierre Curie, two French physicists. EXAMPLE: PZT, which is comprised of lead zirconatetitanate, has a higher voltage-producing capacity than quartz at the same mechanical pressure. These senores are put below in a base or surface for footstep. They intake pressure (mechanical energy) to convert to electrical energy. They have a very high frequency response, making it simple to perceive a parameter changing extremely quickly. In the electronic circuit, they provide a high output. some of the requirement to complete model could be Microcontroller, Piezoelectric Sensor, Neutralizer, LCD display, Battery, inverter, LED, etc According to studies, 5 hours of walking on this may generate enough electricity to illuminate a bus stop formore than 12 hours.

V. WORKING



IV. TECHNOLOGY

Technology behind this is very simply and applicable. The basic working principle of our project is based on the piezoelectric effect.



When mechanical stress is applied to certain materials they generate electricity, the phenomenon known as the piezoelectric effect occurs. And the amount of voltage generated directly correlates to this stress. Piezoelectric sensors can be used to measure this effect. An electric device called a piezoelectric sensor measures acceleration, pressure, or force and converts the data into an electric signal. Theseare even utilized as pressure sensors in mobile phone

As you see in block diagram and labeled circuit,

- Piezoelectric sensor converts the mechanical energy produced due to applied pressure into electric energy by piezoelectric effect.
- A ripple neutralizer is used to smooth out the output of the D.C. rectifier and remove ripples from the rectifier's output.
- Then the voltage flows across in a only one directionwith help of unidirectional diode. Further the batterystores the electricity produced.
- A microcontroller is used. It is a small integrated circuit that is used to direct a certain action and manage the operations of an embedded system.
- There is a output display to display the voltageproduced across.
- There can be a point from circuit to connect externaldevice.
- The stored energy passes across inverter. An inverterconverts the DC electricity from sources such as batteries to AC electricity.
- Then switch is used to disconnect or connect the path in the circuit, interrupting the electric current ordiverting it.
- Once the switch is ON the voltage flows that lightup or perform work.

VI. UNIQUENESS

Usually, we walk for fitness or to move to small distant places. we don't give importance or consciousness whilewe walk. Do you know, you waste lots of energy while you walk, simply delivering into the earth? Each of yourfootsteps is one small source of mechanical energy that can be put together to give bigger sources of electrical energy. This would be done by a footstep power generator by using Piezoelectric Effect. you neither need great technology, investment, situation, temperature, expenditure, in fact only need components for setup. Hence it is easy, adaptive and fitting. we could put our project in mountain or subways, or even from hottest tocoldest place where mankind lives. Why not we could put this in our farm, collages or even in streets.

VII. FEASIBILITY

Basically, you produce energy from alternative sources like solar, wind, nuclear, etc., these good renewable sources but just think if they can be put everywhere (likein a very cold place). Nuclear energy is harmful and needs careful handling.

- But this footstep power generator can generate electricity in most of the conditions (either hot orcold) and anyplace (either home or big organization),
- compact yet sensitive.
- can be used as emergency power resources or usedfor regular energy source.
- great variations.
- lesser space and justified space requirement.
- can produce based on requirement.
- you don't need to perform work.
- No limits

VIII. MARKET

- Our target would organization where lots of people work (so that output would be more) and ones who wants an alternative source of power for the cheaperand easier way.
- We would provide this as a service for rural areas and places where electricity isn't reached to people.
- Nowadays organizations are moving towards energysources like solar, etc., and it would be nice to use this along with that those sources so that it would beprofitable and conservative to full force.
- There are alternative sources for non-renewableenergy like solar, wind, hydro, etc. which are dependent on primary and natural sources.
- But this only footstep that is simply implanted to earth. we don't need any backup or supporting sources. It would be a new way of performing workwithout doing work or using any source.
- The best way to get it to people is to show themwhat it is and its capacity.
- How far it is efficient and its advantages so thatpeople can get positivity of product.
- We could put it to the institution where children canget to know about it.
- We would use marketing sources like digitalsources.
- Provide justified pricing develop project muchefficient than what it was collaboration with organization.

IX. SOCIAL IMPACT

- Affordable and Clean Energy.
- Better Innovation and Infrastructure
- Small step to create Sustainable Cities andCommunities
- We could put it in villages and agricultural land where electricity is insufficient and not reachable.
- It is renewable source.
- Pollution less hence safe for earth and mankind.
- Diversifying energy supply.
- Increases economy and energy security.
- Increase energy for need along with other resources.
- Can provide employment while production.
- Smart and forward way for system.

Examples of Real-world installation with similarconcepts

- Pavegen smart street - London.
- Simon school for boys – UK
- Empire State Building – US
- Panduit corporation world headquarters – US
- Riverdale country school – US

X. CONCLUSION

Everyday there is increase in demand of power across the world. Various people across the world are looking for ways to generate power in all ways and sources possible. One such way could be footstep power generator. We can generate power from our steps with small system anywhere possible. It could help out in various as described previously. Hence, we consider it would be a small source and help to generate the electricity which it basic need for most of activity whose need is increasing every day.