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Solar Chair

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Abstract: **As the energy is the heart of the technology it affects the price of product as well as the overall economy of the industry. Energy is the most important factor in industrial production as well as in the domestic use echo-friendly system as it uses solar power. As sun is the huge source of energy solar energy is the perfect alternative for some energy sources such as electricity, petroleum. In India the large part of the solar energy is wasted because of lack awareness about the solar energy. Mostly the solar energy is used to dry the food grains and mostly to dry the cloths. But last few years are the most memorable years for the India from the last few years most of the peoples decide to install the solar units.**

We are focusing on the need of the alternatives for the conventional energy source. We are using the "SOLAR CHAIR" operated by using solar power, In this we are using solar energy as working fluid. system consist of solar panel, battery, control circuit, converter and USB ports when sun rays come in contact with the solar panel it absorbs most of the solar energy in it after that the energy is used to charge the battery. And that energy we can use for multipurpose like mobile charging, laptop charging, music system, and lights at night.

Keywords: **solar panel, battery, control circuit, converter and USB ports, solar energy.**

I. INTRODUCTION

The goal of this project is to design and build a solar chair that allows the user to safely and conveniently charge their USB devices while they are away from electrical source. This will be accomplished by converting the energy from the sun into power that can be stored in battery and delivered via USB ports. The entire project will be integrated on a solar chair that is safe, portable, and durable. On/Off switch that disconnects the panel from the circuitry Three USB charging ports 100 W solar panel integrated on the This device has many features that make it unique and functional. These features include: chairs canopy to minimize weight and size and utilize space wisely Uses low power microcontrollers to control converter and increase efficiency Durable, water resistant, and sand proof. There's nothing quite like an old rocking chair for finding your center and chilling out. Originally thought to have been developed as garden furniture, the rocker has now come full circle with the development of the Solar chair. The solar chair have solar panels over the top to provide power for up to three USB devices, and some after-dark lighting to allow the person to go on after the sun goes down. "The solar chairs are intended to employ as much human intervention in the generation of electricity as possible, and are positioned horizontally using the handle on the front. When the angle is correct, the chair provide full shade for the person sitting inside. Then once inside, the position of one's body to higher and lower seating positions causes the solar panel to face higher or lower positions in the sky. Here, the human power of balance is used as the 'second axis' of the solar tracker. An LCD panel inside the rocker tells you how well you're doing in terms of optimizing energy production from the available solar energy." Uses the power of the sun to provide the user with a USB ready charging station. the solar powered chair power your phone, your tablet, your laptop and all without you having to worry about water interfacing with your electronics.

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II. LITERATURE SURVEY

1. There are different mobility solutions available in the market. There are chairs which can climb stairs, obey voice commands (Scott Elshout et al, 2007) or even respond to human thoughts. The costs range from a couple of thousand dollars to tens of thousands of dollars, which comes to be around one to ten lakh Indian rupees or more. The bulk of the market is in a basic design which can provide mobility for a person on indoor level surfaces. It is assumed that the user can see where he is going and can press a few switches and operate a joystick control. Most machines have the capability to go up a short ramp, but not up steps. All conventional powered wheelchairs have two motors; one each; driving one of the main wheels one either side of the vehicle, as in manual wheelchairs. All man levering is by varying the relative speed of rotation of the wheels on either side. This is technically called "Differential Steer". In motor wheelchairs the differential steer is achieved by properly controlling the speed ratio of the two motors (Kazuhiko Morimoto et al). The electronics circuit has to interpret the two components of the joystick displacement and control the motor speeds accordingly. Apart from the main pair of driven wheels there has to be pair of castor wheels for support. These align automatically to roll in whichever direction they are pushed.

2. The First Wheel chair No one really knows when the first wheelchair was invented, although there are plenty who are willing to hazard a guess. What interesting is that wheelchairs weren't always invented for the right reason especially where the Romans were concerned. Some believe it was the ancient Egyptians who were the first to use wheelchairs. These were, however, simple handcarts used to push people around nothing like the sophisticated chairs of today. The Chinese also invented chariot-like wheelchairs around this time, although they were pulled rather than pushed. The Romans, as one could imagine, were not inclined to equal rights for disabled people. Instead they treated disabled people almost as bad as a certain US deputy in Florida. The Romans invented wheelchairs not to extend people's mobility, but so that they could push disabled to the fields to work. They weren't all bad, though. Both Greek and Roman physicians prescribed transport for the sick. After a long time in Spain, Philip II fabricated a wheelchair complete with foot rests, enabling him to enjoy a daily wheel around the gardens.

3. Self Propelled Wheel Chair: A young disabled watchmaker called Stephen Farfler builta three wheeled vehicle to transport himself. This was the first self-propelled wheelchair. The next major step forward took place in Bath with the imaginatively named Bath chair. This was invented in 1783. These wheelchairs came in a number of different guises – they could be open or shut, and pushed or pulled. However, in one respect they were a step back from Farflers's invention – none of them were self- propelled. By nineteenth century wheelchair users were propelling themselves by pushing at the outer rim of the wheelchair. Of course, this mean getting their hands dirty.

4. Electric Wheel Chair: The first electric chair was invented in 1890 in US, designed to kill criminals through the application of electric shock. Britain engineers are working on a chair with a different purpose in mind, and the first motorized wheelchair was invented in 1916 which was heavy and expensive. Until 1930′s, the wheelchair was rather cumbersome device. They were bulky and while a lightweight wicker wheelchair had been built, even this could not be easily transported, making travelling very difficult for many wheelchair users.

5. Modern Wheel Chair: The modern wheelchair began to take shape during late19th century to early 20th century with the advent of push rims for self-propulsion and slings for seat and backrests.

Harry Jennings and his disabled friend Herbert Everest, both mechanical engineers, invented the first light weight, steel, collapsible wheelchair in 1933. Mr. Everest broke his back in a mining accident. The two saw the business potential of the invention and went on to become the first mass-manufacturers of wheelchairs: Everest and Jennings. Their "x-brace" design is still in common use, albeit with updated materials and other improvements.

6. Electric Wheel Chair – Modified: Electric wheelchair is invented after WW2 by George Johann Klein, a Canadian, for the injured war veterans. Electric wheelchair is considered to be one of Canada's greatest inventions that have benefited mankind. George came up with the electric wheelchair while he is with the National Research Council of Canada in 1950s. The invention of electric wheelchair is a result of the need to give independence and mobility. Today, the electric wheelchair has changed the lives of millions by providing them a ray of hope that they can be as independent in movements as normal people and gave them optimism inv life. Electric wheelchairs can also be called electric powered wheelchairs, motorized wheelchairs or power wheelchairs. These wheelchairs have some disadvantages too (Frederick

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Walton et al, 2010). Repairing an electric wheelchair consumes money and time. Another drawback is its price. It is not affordable for a common man.

7. Recent Developments: A recent development related to wheelchairs is the hand cycle. They are in variety of forms, from road and track racing models to off-road types model after mountain bikes. There has been significant effort over the past 20years to develop stationary wheelchair trainer platforms that could enable wheelchair users to exercise as one would on a treadmill or bicycle trainer (Langbein, WEdwin et al, 1993; O'Connor, Thomas et al, 2002) Some devices are created that can be used in conjunction with virtual travel and interactive gaming similar to an Omni directional treadmill.

8. World's first solar wheelchair: Haidar Taleb, a 47 year old man from UAE, displayed are combination of human spirit and willpower by building a wheel chair for himself which runs on solar power. Being a person with polio since the age of 4 he did not stop from taking up this challenge on this wheelchair, a piece of technological innovation.

III. COMPONENTS SOLAR CHAIR

The Components of solar chair are

1) Solar panels,
2) Charge controller,
3) Battery
4) Inverter

1) Solar panels:

The output of a solar panel is usually stated in watts, and the wattage is determined by multiplying the rated voltage by the rated amperage. The formula for wattage is VOLTS times AMPS equals WATTS. So for example, a 12 volt 60 watt solar panel measuring about 20 X 44 inches has a rated voltage of 17.1 and a rated 3.5amperage.V x A = W17.1 volts times 3.5 amps equals 60 watts

If an average of 6 hours of peak sun per day is available in an area, then the above solar panel can produce an average 360 watt hours of power per day; 60w times 6 hrs. = 360 watt-hours. Since the intensity of sunlight contacting the solar panel varies throughout the day, we use the term "peak sun hours" as a method to smooth out the variations into a daily average. Early morning and late in the-day sunlight produces less power than the mid-day sun. Naturally, cloudy days will produce less power than bright sunny days as well.

2) Charge Controller:

A charge controller monitors the battery's state-of-charge to insure that when the battery needs charge-current it gets it, and also insures the battery isn't over charged. Connecting a solar panel to a battery without a regulator seriously risks damaging the battery and potentially causing a safety concern. Charge controllers (or often called charge regulator) are rated based on the amount of amperage they can process from a solar array. If a controller is rated at 20 amp sit means

that you can connect up to 20 amps of solar panel output current to this one controller. The most advanced charge controllers utilize a charging principal referred to as Pulse-Width-Modulation (PWM) - which insures the most efficient battery charging and extends the life of the battery

3) Battery:

Lead-acid batteries are the most common in PV systems because their initial cost is much lower and because they are readily available nearly anywhere in the world. There are many different sizes and designs of this battery type, but the most important designation is whether they are deep cycle batteries or shallow cycle batteries.

4) Inverter:

An inverter is a device which changes DC power stored in a battery to standard 120/240 VAC electricity (also referred to as 110/220). Most solar power systems generate DC current which is stored in batteries. Nearly all lighting, appliances, motors, etc., are designed to use ac power, so it takes an inverter to make these witch from battery-stored DC to standard power (120 VAC, 60 Hz).In an inverter, direct current (DC) is switched back and forth to produce alternating current (AC). Then it is transformed, filtered, stepped, etc. to get it to an acceptable output waveform. The more processing the cleaner and quieter the output, but the lower the efficiency of the conversion. The goal becomes to produce a waveform that is acceptable to all loads without sacrificing too much power into the conversion process.

IV. CONCLUSION

There is currently no product like this out there on the market. Products exist that can charge cell phones using solar energy but our project aims to go one step further and provide a whole new outdoor experience. With other products, having the ability to charge two devices would require having to buy one or two separate solar chargers. All of these things, along with your chair, and devices, would then have to be carried to your destination. The Solar Chair will integrate everything you need.

V. SCOPE FOR THE FUTURE WORK

We can use Flexible solar panel

Bus USB configuration

Built in speaker and fan

Adjustable canopy.

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