

Design and Fabrication of Medical Therapy Chair

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Abstract: Everyone has a desire to live a normal human life but accidents, diseases, elder-ship make their desire into disability. The percentage of patients in India is increasing day by day. Moreover there are lots of handicaps, elders and paralyzed people. The aim of this project is to merge therapies like vibration, heating and cooling in a single wheelchair at low cost. A smart wheelchair is developed by using lead screw mechanisms. A therapy chair offers comfort and support beyond a standard chair or lounge, offering additional comfort.. From height of adjustable chair to those designed to relieve pressure, our selection of therapeutic chairs can provide comfort and support for a range of mobility issues. We are availing these three therapies in a single chair by modifying the existing system.

Keywords: Wheelchair, Therapy, Vibration, Heating, Cooling.

I- INTRODUCTION

The need for Medical Therapy Chair is faced as the numbers of accidents are rising now a day. They always need another person in moving and have to go under some physical therapies under the guidance of a therapist to recuperate their strain back. Medical system is available all over the world which makes human life comfortable and continent. In this paper the proposed system helps them to move freely & safely and also takes the activities of a therapist in a cost effective manner. For those experiencing mobility challenges, proper seating and support are essential to feel comfortable and staying free from pain. Wheelchair with adjustable portion of back rest and leg rest and can provide all necessary movement.

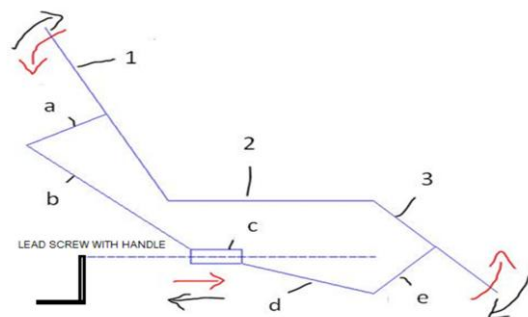
II- PROBLEM DEFINITION

- The percentages of patients are increasing day by day.

- The patient needs to travel different places for taking therapies
- This process is troublesome and may complicate the situation.

III- CONCEPT

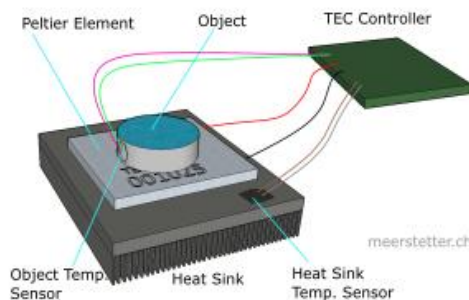
The concept behind this project is to provide a chair with three therapies – vibration, heating and cooling. The therapies are provided for back pain and even for patients suffering from bed sore. For both heating and cooling pettier element is used (weight:370g, type: cooling and heat sink kit, power: dc 12v 6a). For vibration therapy instead of slab plate small vibration motors are used, which reduce the jerk effect (uxcell a 1210600ux0224 dc 12v 3100rpm). One therapy is provided at one time. According to doctors prescription, the temperature would be set by controller. Regulator is also provided for vibration. Lead screw is used for adjusting back reek angle as per comfort.



IV- COMPONENTS

A. Heating and Cooling with a Peltier Element :- Thermoelectric cooling (TEC) has become the method of choice for fast and compact temperature control. An electrical current through a so-called Peltier element

produces an active heat transport. With one side attached to a heat sink, the "object" side of the thermoelectric element can be cooled or heated in respect to the heat sink. A Peltier controller with bipolar output generates the currents accordingly when aiming for a target temperature. To that end, the Peltier controller must know the object's temperature, thus have a sensor input. Primary criteria for the selection of a Peltier controller are its current and voltage ratings, precision and stability. Other important characteristics of a Peltier controller may be its safety features, ease of use (communication, auto-tuning, bundled software), device size and efficiency. Overall efficiency analysis should not only consider losses in the Peltier controller, but throughout all cooling equipment, including the Peltier element.

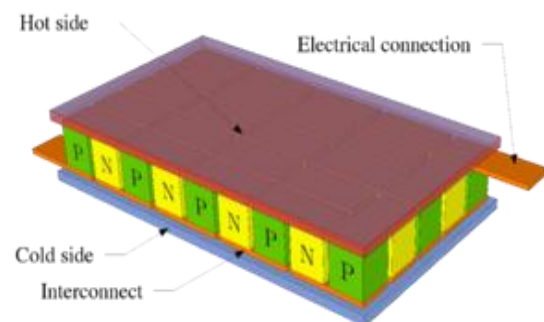


B. Peltier Modul

Thermoelectric cooling uses the Peltier effect to create a heat flux between the junction of two different types of materials. A Peltier cooler, heater, or thermoelectric heat pump is a solid-state active heat pump which transfers heat from one side of the device to the other, with consumption of electrical energy, depending on the direction of the current. Such an instrument is also called a Peltier device, Peltier heat pump, solid state refrigerator, or thermoelectric cooler (TEC). It can be used either for heating or for cooling, although in practice the main application is cooling. It can also be used as a temperature controller that either heats or cools.

This technology is far less commonly applied to refrigeration than vapor-compression refrigeration is. The primary advantages of a Peltier cooler compared to a vapor-compression refrigerator are its lack of moving parts or circulating liquid, very long life, invulnerability to leaks, small size, and flexible shape. Its main disadvantages are high cost and poor power efficiency. Many researchers and companies are trying to develop

Peltier coolers that are cheap and efficient. A Peltier cooler can also be used as a thermoelectric generator. When operated as a cooler, a voltage is applied across the device, and as a result, a difference in temperature will build up between the two sides. When operated as a generator, one side of the device is heated to a temperature greater than the other side, and as a result, a difference in voltage will build up between the two sides (the Seebeck effect). However, a well-designed Peltier cooler will be a mediocre thermoelectric generator and vice versa, due to different design and packaging requirements



C. Leatheroid:-

Leatheroid is cellulose material very similar to vulcanized fibre in physical properties and uses. It is prepared using unsized cotton rag paper (as is vulcanized fibre) and mineral acid.

D. Heaton Sheet:-

Heaton is a product that combines physically cross-linked polypropylene foam and polyethylene foam. It's inside has PP foam with heat-resistant property ; the middle layer is a PE foam structure suitable for Insulation. The surface consists of outer film layers subjected to surface embo treatment for durability And beauty. It's excellent thermal insulation, fire retardant property, durability, decay resistance, and chemical resistance make it an ideal, highly environment- friendly building material. Thanks to it's Superiority to a rubber foaming product, it is rapidly replacing the rubber product.

V-CONCLUSION

The wheelchair provides heating, cooling and vibration therapies. The efforts are reduced and the comfort is increased. It is safe and reliable product. Prevention of incapable of surviving serious injuries.

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