Intelligent Shoes By The Ability Of Adapting To Circumferential Conditions

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Abstract

Regarding that most of the people`s feet get cold in cold weather, it causes that they couldn`t walk for a long time or stay out. For solving this problem, the researcher believes that warming the shoe and designing an idea can be effective. We can use this idea for cold zones which warm the people`s feet and prevent freezing the mountaineer`s feet in high altitudes and also to prevent and protect people with joints diseases in their feet.

In this idea, we want to use heater circuit that produce necessary heat. This circuit can be feed from voltage producer source of piezoelectic which produces voltage with pressure of person weight force and obtains necessary energy for heater circuit. Now to control the produced heat in heater circuit, a sensor will be used, so when the temperature gets higher than the expression, IC disconnect the nutrition source connecting with heater circuit and when the temperature get lower than the exception, IC connects the source connecting with heater. To explain the produced heat in shoes, we can use flexible parts. It`s clear that produced voltage for nutritional elements by piezoelectric aren`t adequate and we need to increasing the level of produced voltage, due to this we use voltage amplifier, Increase the level of produced voltage by piezoelectric. For preventing of wasting produced heat, in cover of shoe, a heat proof material is used and for preventing the harm of the circuit in winter zones, a kind of substance is used on the cover of the shoes, which must be waterproof.

Keywords: shoe-heat- piezoelectic -cold-walk

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1. Introduction

The earliest known shoes are sandals dating from approximately 7,000 or 8,000 B.C., found in the Fort Rock Cave in the US state of Oregon. in 1938.[1] The world's oldest leather shoe, made from a single piece of cowhide laced with a leather cord along seams at the front and back, was found in a cave in Armenia in 2008 and is believed to date to 3,500 B.C.[2][3] Ötzi the Iceman's shoes, dating to 3,300 BC, featured brown bearskin bases, deerskin side panels, and a bark-string net, which pulled tight around the foot.[4] However, it is estimated that shoes may have been used long before this, but it is difficult to find evidence of the earliest footwear due to the highly perishable nature of early shoes.[5] By studying the bones of the smaller toes (as opposed to the big toe), it was observed that their thickness decreased approximately 40,000 to 26,000 years ago. This led archaeologists to deduce that wearing shoes resulted in less bone growth, resulting in shorter, thinner toes.[6] These earliest designs were very simple in design, often mere "foot bags" of leather to protect the feet from rocks, debris, and cold. They were more commonly found in colder climates. Many early natives in North America wore a similar type of footwear known as the moccasin. These are tight-fitting, soft-soled shoes typically made out of leather or bison hides. Many moccasins were also decorated with various beads and other adornments. Moccasins were not designed to get wet, and in wet weather and warm summer months, most Native Americans went barefoot.[7]As civilizations began to develop, thong sandals (the precursors of the modern flip-flop) were worn. This practice dates back to pictures of them in ancient Egyptian murals from 4,000 B.C. One pair found in Europe was made of papyrus leaves and dated to be approximately 1,500 years old. They were also worn in Jerusalem during the time of Jesus Christ.[8] Thong sandals were worn by many civilizations and made from a wide variety of materials. Ancient Egyptian sandals were made from papyrus and palm leaves. The Masai of Africa made them out of rawhide. In India, they were made from wood. In China and Japan, rice straw was used. The leaves of the sisal plant were used to make twine for sandals in South America, while the natives of Mexico used the Yucca plant.[9][10]While thong sandals were commonly worn, many people in ancient times, such as the Egyptians, Hindu and Greeks, saw little need for footwear, and most of the time, preferred being barefoot. The Egyptians and Hindus made some use of ornamental footwear, such as a soleless sandal known as a "Cleopatra", which did not provide any practical protection for the foot. The ancient Greeks largely viewed footwear as self-indulgent, unaesthetic and unnecessary. Shoes were primarily worn in the theater, as a means of increasing stature, and many preferred to go barefoot.[11] Athletes in the Ancient Olympic Games participated barefoot – and naked.[12] Even the gods and heroes were primarily depicted barefoot, and the hoplite warriors fought battles in bare feet and Alexander the Great conquered his vast empire with barefoot armies. The runners of Ancient Greece are also believed to have run barefoot. Pheidippides, the first marathoner, ran from Athens to Sparta in less than 36 hours.[12] After the Battle of Marathon, he ran straight from the battlefield to Athens to inform the Athenians of the news.[13]The Romans, who eventually conquered the Greeks, and adopted many aspects of their culture, did not adopt the Greek perception of footwear and clothing. Roman clothing was seen as a sign of power, and footwear was seen as a necessity of living in a civilized world, although the slaves and paupers usually went barefoot.[13] Roman soldiers were issued with chiral footwear.[14] There are many references to shoes being worn in the Bible. During weddings of this period, a father would give his son-in-law a pair of shoes, to symbolize the transfer of authority.[15]A common casual shoe in the Pyrenees during the Middle

Ages are espadrilles. These are sandals with braided jute soles and a fabric upper portion, and often includes fabric laces that tie around the ankle. The term is French and comes from the esparto grass. The shoes originate in the Catalonian region of Spain as early as the 13th century, and were commonly worn by peasants in the farming communities in the area.[16]Many medieval shoes were made using the turnshoe method of construction, in which the upper was turned flesh side out, and was lasted onto the sole and joined to the edge by a seam. The shoe was then turned inside-out so that the grain was outside. Some shoes were developed with toggled flaps or drawstrings to tighten the leather around the foot for a better fit. Surviving medieval turnshoes often fit the foot closely, with the right and left shoe being mirror images.[17] The turnshoe method was replaced by the welted method around 1500.[18]By the 15th Century, pattens became popular by both men and women in Europe. These are commonly seen as the predecessor of the modern high-heeled shoe,[19] while the poor and lower classes in Europe, as well as slaves in the New World, were barefoot.[20] In the 15th century, the Crakow was fashionable in Europe. This style of shoe is named because it is thought to have originated in Kraków, the capitol of Poland. The style is characterized by the point of the shoe, known as the "polaine", which often was supported by a whalebone tied to the knee to prevent the point getting in the way while walking.[21] Also during the 15th century, chopines were created in Turkey, and were usually 7-8 inches (17.7-20.3 cm) high. These shoes became popular in Venice and throughout Europe, as a status symbol revealing wealth and social standing. During the 16th century, royalty started wearing high-heeled shoes to make them look taller or larger than life, such as Catherine de Medici or Mary I of England. By 1580, even men wore them, and a person with authority or wealth was often referred to as, "well-heeled".[22]Eventually the modern shoe, with a sewn-on sole, was devised. Since the 17th century, most leather shoes have used a sewn-on sole. This remains the standard for finer-quality dress shoes today. Until around 1800, welted rand shoes were commonly made without differentiation for the left or right foot. Such shoes are now referred to as "straights".[23] Only gradually did the modern foot-specific shoe become standard.Since the mid-20th Century, advances in rubber, plastics, synthetic cloth, and industrial adhesives have allowed manufacturers to create shoes that stray considerably from traditional crafting techniques. Leather, which had been the primary material in earlier styles, has remained standard in expensive dress shoes, but athletic shoes often have little or no real leather. Soles, which were once laboriously hand-stitched on, are now more often machine stitched or simply glued on. Many of these newer materials, such as rubber and plastics, have made shoes less biodegradable. It is estimated that most mass-produced shoes require 1000 years to degrade in a landfill.[24] In the late 2000s, some shoemakers picked up on the issue and began to produce shoes made entirely from degradable materials, such as the Nike Considered.[25][26]In 2007, the global shoe industry had an overall market of $107.4 billion, in terms of revenue, and is expected to grow to $122.9 billion by the end of 2012. Shoe manufacturers in the People's Republic of China account for 63% of production, 40.5% of global exports and 55% of industry revenue. However, many manufacturers in Europe dominate the higher-priced, higher value-added end of the market.[27]

2. Materials and Method

Circuit, piezoelectric, IC, shoe, sensor, wire, amplifier, non-conductor and water detent, elementShoes are most important tools which are used in idea. The only advantage is that in

addition to high volume, it is heat and water detent. In this shoe piezoelectric is sat under the heel and in used for feeding circuit, In a way that the weight of user results in producing electrical (energy). In this shoe elements are sat on the surface of the shoes and in the insole of shoe. Feeding surface guides the electrical power (energy) to the circuit and circuit guides it in to the elements and as a result elements start the heat producing.In order to control the heat which is produced by elements, the heat sensor was used, so that when temperature of shoe is higher than expected temperature, IC cuts the connection of circuit with feeding source and when temperature of shoe is lower than expected temperature, IC connects the circuit with feeding source.It is the evident that the produced energy by piezoelectric is not enough for the needed energy of circuit uses, so amplifier was used for strengthening the produced energy. For preventing the losing energy and also preventing disordering of system the heat and water detents were used. The reason for placing the elements in mentioned place is the nearing of elements to the foot.

3. Results

An electrical network is an interconnection of electrical elements such as resistors, inductors, capacitors, voltage sources, current sources and switches. An electrical circuit is a network consisting of a closed loop, giving a return path for the current. Linear electrical networks, a special type consisting only of sources (voltage or current), linear lumped elements (resistors, capacitors, inductors), and linear distributed elements (transmission lines), have the property that signals are linearly superimposable. They are thus more easily analyzed, using powerful frequency domain methods such as Laplace transforms, to determine DC response, AC response, and transient response.A resistive circuit is a circuit containing only resistors and ideal current and voltage sources. Analysis of resistive circuits is less complicated than analysis of circuits containing capacitors and inductors. If the sources are constant (DC) sources, the result is a DC circuit.By means of different shoes and different circuits we got different experiences in this field. At the beginning a pair of boots were used but in spite of high resistance because of high weight was not comfortable. The plastic shoes were used but they resulted in losing energy and high heat. After leathern shoes were used they just like boots, were so heavy. We also used spongy shoes which were so light but because of low resistance could not be used for our aim. Finally sports shoes were used because they are of high quality and also are light.The wires in circuit at first were of high resistance and also of high weight and so resulted in high heat and high weight, thus the wires which were of lower resistance and lower weight were used which resulted in equivalent heat.The detents which are used is shoes should be light for not changing the weight of shoes in general.Electrical phenomena have been studied since antiquity, though progress in theoretical understanding remained slow until the seventeenth and eighteenth centuries. Even then, practical applications for electricity were few, and it would not be until the late nineteenth century that engineers were able to put it to industrial and residential use. The rapid expansion in electrical technology at this time transformed industry and society. Electricity's extraordinary versatility means it can be put to an almost limitless set of applications which include transport, heating, lighting, communications, and computation. Electrical power is now the backbone of modern industrial society.[32]The presence of charge gives rise to the electromagnetic force: charges exert a force on each other, an effect that was known, though not understood, in antiquity.[33] A lightweight ball suspended

from a string can be charged by touching it with a glass rod that has itself been charged by rubbing with a cloth. If a similar ball is charged by the same glass rod, it is found to repel the first: the charge acts to force the two balls apart. Two balls that are charged with a rubbed amber rod also repel each other. However, if one ball is charged by the glass rod, and the other by an amber rod, the two balls are found to attract each other. These phenomena were investigated in the late eighteenth century by Charles-Augustin de Coulomb, who deduced that charge manifests itself in two opposing forms. This discovery led to the well-known axiom: like-charged objects repel and opposite-charged objects attract.[34[The force acts on the charged particles themselves, hence charge has a tendency to spread itself as evenly as possible over a conducting surface. The magnitude of the electromagnetic force, whether attractive or repulsive, is given by Coulomb's law, which relates the force to the product of the charges and has an inverse-square relation to the distance between them.[35][36] The electromagnetic force is very strong, second only in strength to the strong interaction,[36] but unlike that force it operates over all distances.[36] In comparison with the much weaker gravitational force, the electromagnetic force pushing two electrons apart is 1042 times that of the gravitational attraction pulling them together.[37[The charge on electrons and protons is opposite in sign, hence an amount of charge may be expressed as being either negative or positive. By convention, the charge carried by electrons is deemed negative, and that by protons positive, a custom that originated with the work of Benjamin Franklin.[38] The amount of charge is usually given the symbol Q and expressed in coulombs;[38] each electron carries the same charge of approximately −1.6022×10−19 coulomb. The proton has a charge that is equal and opposite, and thus +1.6022×10−19 coulomb. Charge is possessed not just by matter, but also by antimatter, each antiparticle bearing an equal and opposite charge to its corresponding particle.[38[Charge can be measured by a number of means, an early instrument being the gold-leaf electroscope, which although still in use for classroom demonstrations, has been superseded by the electronic electrometer.[39]

4. Discussion

Temperature sensors are one of the main centers of regulating body temperature which are foot and around foot of which is the main focus of our research. Our aim is helping to make the feel of comfort and stopping fatigue by means of managing physiological conditions of foot. It’s evident that any change in temperature like heat or cold results in fatigue and impatience, so we try to solve this problem. The problem of regulating temperature is crucial in space suits and cannot be solved till now. Our search is for solving this problem and we hope to solve it as soon as possible

5. Helpful Hints

The medial terminal branch (internal branch) divides into two dorsal digital nerves (nn. digitales dorsales halluces lateralis et digiti secundi medialis) which supply the adjacent sides of the great and second toes,The medial dorsal cutaneous nerve (internal dorsal cutaneous branch) passes in front of the ankle-joint, and divides into three dorsal digital branches, one of which supplies the medial side of the great toe, the other, the adjacent sides of the second and third toes.The intermediate dorsal cutaneous nerve divides into four dorsal digital branches, which supply the medial and lateral sides of the third and fourth, and of the fourth and fifth toes.The lateral dorsal cutaneous nerve from the sural nerve turns into a dorsal digital nerve and supplies the lateral side of the fifth toe. Diabetes mellitus is classified into four broad categories: type 1, type 2,

gestational diabetes, and "other specific types".[28] The "other specific types" are a collection of a few dozen individual causes.[29] The term "diabetes", without qualification, usually refers to diabetes mellitus. The rare disease diabetes insipidus has similar symptoms to diabetes mellitus, but without disturbances in the sugar metabolism (insipidus means "without taste" in Latin) and does not involve the same disease mechanisms.The term "type 1 diabetes" has replaced several former terms, including childhood-onset diabetes, juvenile diabetes, and insulin-dependent diabetes mellitus (IDDM). Likewise, the term "type 2 diabetes" has replaced several former terms, including adult-onset diabetes, obesity-related diabetes, and noninsulin-dependent diabetes mellitus (NIDDM). Beyond these two types, there is no agreed-upon standard nomenclatureType 1 diabetes mellitus is characterized by loss of the insulin-producing beta cells of the islets of Langerhans in the pancreas, leading to insulin deficiency. This type can be further classified as immune-mediated or idiopathic. The majority of type 1 diabetes is of the immune-mediated nature, in which beta cell loss is a T-cell-mediated autoimmune attack.[30] There is no known preventive measure against type 1 diabetes, which causes approximately 10% of diabetes mellitus cases in North America and Europe. Most affected people are otherwise healthy and of a healthy weight when onset occurs. Sensitivity and responsiveness to insulin are usually normal, especially in the early stages. Type 1 diabetes can affect children or adults, but was traditionally termed "juvenile diabetes" because a majority of these diabetes cases were in children.Brittle" diabetes, also known as unstable diabetes or labile diabetes, is a term that was traditionally used to describe the dramatic and recurrent swings in glucose levels, often occurring for no apparent reason in insulin-dependent diabetes. This term, however, has no biologic basis and should not be used.[31] There are many reasons for type 1 diabetes to be accompanied by irregular and unpredictable hyperglycemia, frequently with ketosis, and sometimes serious hypoglycemia, including an impaired counter regulatory response to hypoglycemia, occult infection, gastro paresis (which leads to erratic absorption of dietary carbohydrates), and endocrinopathies (e.g., Addison's disease).[7] These phenomena are believed to occur no more frequently than in 1% to 2% of persons with type 1 diabetes.[8]

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