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Analysis and Synthesis of Smart BASSINETS for Infants

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ABSTRACT:A cradle is an infant bed which rocks but is non-mobile.[1] It is distinct from a typical bassinet which is a basket-like container on free-standing legs. An infant bed is a small bed especially for infants and very young children. Infant beds are a historically recent development intended to contain a child capable of standing. The cage-like design of infant beds restricts the child to the bed. Around two or three years of age, children are able to climb out and are moved to a toddler bed to prevent an injurious fall while escaping the bed.

We live in a world where technologies are used all around us. The new generations of parents were raised with technology. There are many things these parents will buy to help them care for their baby (Cradle, Crib, Baby Monitor, etc.).The present project work is aimed to develop a reduced working model of a baby cradle system for making baby comfortable in a single room while sleeping. The simple crank mechanism is used for driving the cradle and sensor are implemented for automation. The cradle is fabricated to suit the new born baby.

I. INTRODUCTION

Parents in the present world are busy in their professional life, so they do not get sufficient time to take care of their babies. It may be expensive for the household to afford a nanny. Today's woman has to manage home along with their office work simultaneously. After long working hours, they have to take care of the home along with the baby. They may not get enough time to swing the cradle manually and sooth the baby. Moreover, in today's life style, it is very difficult even for the housewives to sit nearby their infants and sooth them whenever they cry.
Hospitals have neonatal and maternity units. Nurses in these units have to take care of baby and sooth them whenever they cry.

The system is designed to help parents and nurses in infants care. The design aims at following points:
1. Cradle starts swinging automatically when baby cry and swings till the baby stops crying.
2. Sounds an alarm when mattress gets wet.
3. Sounds an alarm if baby cries for more than a stipulated time indicating that baby needs attention.

Generally, the baby cradle is used for to make sleep and soothe to baby. For example guardian have to take care of their child till as they asleep. However, conventional cradle does not electronically equipped such like battery or adapter to automate the cradle automatically. In Addition to that, these kind of conventional cradle is used in villages areas or non-developed cities due to its low prices. But the problem of this kind of designated cradle is that you need manpower to take care of your child and your child may not be safe and feel comfortable in the conventional cradle. Thus, we need automatic cradle to take care of child which uses the battery or power source. Besides, there are extra features or function is provided by the newly automatic cradle that is beneficial for parents. Because in the present world people are very busy in their professional life so they do not get ample time to take care of their infants. It will be very difficult control the babies and if someone is hiring professional to take care of their infants. It may increase your expenses from monthly expenditure. Moreover, in today, life it is very hard to even for the homemakers (mummy) to sit nearby their babies and sooth them whenever they feel uncomfortable. Though, it is automatic this application is very useful for the nurses in maternity units of hospital.

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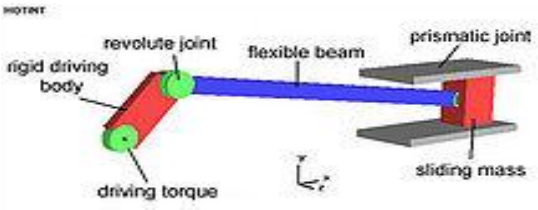
II. CRADLE PARTS DETAILS AND ANALYSIS

A. Slider- Crank Mechanism

The Slider-crank mechanism is used to transform rotational motion into translational motion by means of a rotating driving beam, a connection rod and a sliding body. In the present example, a flexible body is used for the connection rod. The sliding mass is not allowed to rotate and three revolute joints are used to connect the bodies. While each body has six degrees of freedom in space, the kinematical conditions lead to one degree of freedom for the whole system.



A slider crank mechanism converts circular motion of the crank into linear motion of the slider. In order for the crank to rotate fully the condition L> R+E must be satisfied where R is the crank length L is the length of the link connecting crank and slider and E is the offset of slider . A slider crank is a RRRP type of mechanism i.e. It has three revolute joints and 1 prismatic joint. The total distance covered by the slider between its two extreme positions is called the path length. Kinematic inversion of slider crank mechanisms produces ordinary anwithworth quick return mechanism

B. DC Motor

A **DC motor** is any of a class of electrical machines that converts direct current electrical power into mechanical power. The most common types rely on the forces produced by magnetic fields. Nearly all types of DC motors have some internal mechanism, either electromechanical or electronic; to periodically change the direction of current flow in part of the motor. Most types produce rotary motion; a linear motor directly produces force and motion in a straight line.
DC motors were the first type widely used, since they could be powered from existing direct-current lighting power distribution systems. A DC motor's speed can be controlled over a wide range, using either a variable supply voltage or by changing the strength of current in its field windings. Small DC motors are used in tools, toys, and appliances. The universal motor can operate on direct current but is a lightweight motor used for portable power tools and appliances. Larger DC motors are used in propulsion of electric vehicles, elevator and hoists, or in drives for steel rolling mills. The advent of power electronics has made replacement of DC motors with AC motors possible in many applications.

C. Battery

The lead-acid battery was invented in 1859 by French physicist Gaston Planté and is the oldest type of rechargeable battery. Despite having a very low energy-to-weight ratio and a low energy-to-volume ratio, its ability to supply high surge currents means that the cells have a relatively large power-to-weight ratio. These features, along with their low cost, make it attractive for use in motor vehicles to provide the high current required by automobile starter motors.
As they are inexpensive compared to newer technologies, lead-acid batteries are widely used even when surge current is not important and other designs could provide higher energy densities. Large-format lead-acid designs are widely used for storage in backup power supplies in cell phone towers, high-availability settings like hospitals, and stand-alone power systems. For these roles, modified versions of the standard cell may be used to improve storage times and reduce maintenance requirements. Gel-cells and absorbed glass-mat batteries are common in these roles, collectively known as VRLA (valve-regulated lead-acid) batteries.

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D. Motion Detector

A motion detector is a device that detects moving objects, particularly people. A motion detector is often integrated as a component of a system that automatically performs a task or alerts a user of motion in an area. Motion detectors form a vital component of security, automated lighting control, home control, energy efficiency, and other useful systems.

E. Servo Motor / Rotation Sensor

Each motor has a built-in Rotation Sensor. This lets your control your robot's movements precisely. The Rotation Sensor measures motor rotations in degrees or full rotations [accuracy of +/- one degree]. One rotation is equal to 360 degrees, so if you set a motor to turn 180 degrees, its output shaft will make half a turn.

F. Sound Sensor

The Sound Sensor can detect both decibels [dB] and adjusted decibel [dBA]. A decibel is a measurement of sound pressure.**dB A**: in detecting adjusted decibels, the sensitivity of the sensor is adapted to the sensitivity of the human ear. In other words, these are the sounds that your ears are able to hear..**dB**:in detecting standard [unadjusted] decibels, all sounds are measured with equal sensitivity. Thus, these sounds may include some that are too high or too low for the human ear to hear.

The Sound Sensor can measure sound pressure levels up to 90 dB – about the level of a lawnmower. Sound pressure levels are extremely complicated, so the Sound Sensor readings on the MINDSTORMS NXT are displayed in percent [%]. The lower the percent the quieter the sound. For example:

- 4-5% is like a silent living room
- 5-10% would be someone talking some distance away
- 10-30% is normal conversation close to the sensor or music played at a normal level
- 30-100% are people shouting or music being played at a high volume.

G. Baby Bed Wetting Urine Sensor

Sensitive Baby Bed Wetting Urine Sensor Wet Diaper Alarm Detector Features: Safe and reliable, no side effects. For children of 0-2 years old. Induction one second that will alert, easy to use. Perfect for avoiding baby catching cold or suffering from crotch eczema due to bedwetting. Material: ABS + Sensor Chip. How to use: Placed wet alert bedside or other suitable places, placed the alert's sensor chip under baby's diaper insert. (Do not direct contact with skin). Turn the switch to NO. Once baby pee, the alarm will remind parents immediately with the music to changing diapers. Then turn the witch to OFF, disarm the alarm. And dry sensor chip with a paper towel or cloth, the wet alarm can be used again. Notice: 1, Use a damp cloth to clean the sensor after every use. Do not submerge the sensor in water or use tissue paper. Also, not cleaning the sensor after every use can lead to skin irritation due to it no longer be hygienic. 2, if the alert is not used for a long time, please turn it off. 3, Make sure that sleep-tight alert is used under the guidance of adults.be careful not to let the baby swallow it. Package Included: 1 x Baby Bed Wetting Sensor.

H. Bassinet

A bassinet is a small bed specifically for baby contains a child. Around two or three years of age, children are able to climb out. Bassinet prevents them for an injurious fall while escaping the bed. This bassinet mainly contains a cloth and a frame required to support it. The mosquito net is used to coverthe baby for protectionagainst mosquito attack.

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III. IMPLIMENTATION OF SURFACE BODY TEMPRATURE MEASURING SYSTEM

Observing of the body temperature of the new conceived children is of awesome significance,particularly for the untimely and basically sick babies[12]. Remembering this numerous scientists are attempting to create temperature checking framework. In this paper, a NTC thermistor was utilized for outlining a temperature checking framework. Among a wide range of temperature sensor, most dependable ones are thermistors. Thermistors are fundamentally ceramic semiconductors which have negative warm coefficients, i.e., the resistance of thermistor is nonlinearly and conversely identified with the temperature which permits to focus little temperature variety at lower temperature range. The surface temperature sensor STS-BTA is an 23uncommon kind of thermistor which has the extra thermistor to detect the temprature it has benefit of high accuracy and flexibility. It is limited uses in water and air. The sensor has 15k-ohm NTC thermistor, which is governed by stein-hart equation

$T=[K0 + K1 (\ln 1000R) + K2 (\ln 1000R)^3]$

IV. CONCLUSION/RECOMMENDAIONS

Project methodology is proposed to inculcate and enhance the outcome based education in technical educations for designing of various mechanical parts and analytics of forces acting on it. The present model is good for the student in Bringing out skills of the students and makes them work on it to make him an expertise in his domain. Enhancing outcome based education which is highly essential for technical students. Creating the path for the students in enhancing the application of technical skills.

•The automatic electronic baby cradle is the finest solution for those houses working mothers & working parents who cannot find the sufficient time for their babies.

• This automatic baby cradle would let the working mother to do their household works with taking care of their baby at the same time.

• The easily conversion of baby cradle to baby stroller mechanism will be of great use.

• The used magnetic force mechanism will comparatively consume the less power.

• Such many more features of this device makes this product sophisticated and easily acceptable.

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