



GENERAL IDEA ABOUT DESIGN AND FABRICATION OF BABY CRADAL

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Abstract

Infants or a toddlers needs parents' attention 24 hours a day and 7 days a week, which is practically impossible due to other priorities like house hold activities, official works and personal works.

Baby care centre or nanny are the two options available which involves lot of passion. Now a day's lot of incidents are reported in social media featuring human attack to the toddlers in a brutal way. So, there is a need for safe and secure place to take good care of the children's need with minimum human intervention.

Keywords: smart baby cradle, manufacturing process

1. 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. After long working hours, they have to take care of the home along with the baby.

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.

A. Background

With rising costs and relatively busy lifestyles, newborn parents have to sacrifice a lot of time to raise and care for a baby, as well as do day to day task. Parents still have to cook, clean, do laundry, etc. but have to either choose to finish a task or go comfort the baby. Other times maybe the parents are outside gardening or taking a shower, and unable to hear the baby cry.

We realized that every single one of our friends had a smartphone, and they all will most likely be parents in the near future as well. After talking to some relatives and friend about what was hard about raising a baby, we decided we wanted to make a Cradle and add features to it.

It should have an automatic way to comfort the baby if the parent can't get to the baby right away. After coming up with a couple of features we decided to pursue this idea.



2. LITERATURE REVIEW

A cradle is an infant bed which rocks but is non-mobile. It is distinct from a typical bassinet which is a basket-like container on free-standing legs.

A. DESIGN, FABRICATION AND ANALYSIS OF AUTOMATED CRADLE

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DC motor will provide rotational motion according to its rated power. As per microcontroller programming the motor rotates in clockwise direction for given certain time period and in anticlockwise direction for certain time period .When the motor rotates in clockwise direction it pushes the bassinet to front side & when motor rotatesIn anticlockwise direction it pushes the bassinet on the Either side. And in this way the system will keep working.

B. Automatic E-Baby Cradle Swing based on Baby Cry

By Misha Goyal & Dilip Kumar
International Journal of Computer Applications.
Volume 71–No.21, June 2013

E-Baby Cradle swings automatically when baby cries, for this it has a cry analyzing system which detects the baby cry voice and accordingly the cradle swings till the baby stops crying. The speed of the cradle can be controlled as per the user need. The system has inbuilt alarm that indicates two conditions first when the mattress is wet, which is an important parameter to keep the baby in hygienic condition, second when baby does not stop crying with in a stipulated time, which intimated that baby needs attention.

3. NEED OF PROJECT

A. Scope

The main feature of our product is to create the communication between parents and their babies when they are not together. We want the parents to be able to see their babies by phone and softly rock the cradle to comfort babies when they cry.

B. Benefits

The benefits of our product are listed as three main aspects:

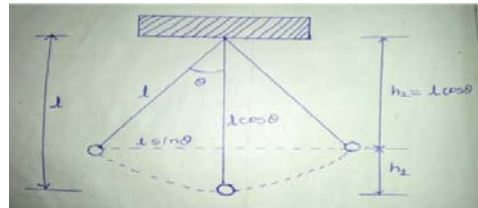
1. Providing valuable free time for new parents.
2. Reducing stress on baby with instant notification and care.
3. User-friendly all-in-one system with android phone app controllable.

4. OBJECTIVE

- Improving the mechanism of providing the motion to the bassinet.
- To help parents especially those who are busy, doesn't have maid, nursery and many more.
- To attain the noiseless working of the cradle.
- To achieve jerk free motion

5. DESIGN

A. Calculation



- Determination of the height of pendulum

The height of pendulum can be determine by following equation,

$$h_1 = l - h_2 \text{ where } h_2 = l (\cos \theta)$$

$$h_1 = l - l (\cos \theta)$$

$$= l (1 - \cos \theta)$$

- Determination of the force of pendulum

The force of pendulum can be determine by following equation,

Potential energy = Transfer distance

$$mgh = F \times d$$

$$F = \frac{mgh}{d}$$

$$F = \frac{mg(1 - \cos \theta)l}{2l \sin \theta}$$

Where m=mass of bassinet and baby
= 15 kg
g = mass gravity
= 9.81

$$\theta = 30^\circ$$

$$F = \frac{15 \times 9.81 (1 - \cos 30^\circ)}{2 \sin 30^\circ}$$

$$F = 42.48 \text{ N}$$

- Determination of the load of pendulum

The load of pendulum can be determine by following equation,

$$W = m \times g$$

$$W = 15 \times 9.81$$

$$W = 147.15 \text{ N}$$

- Determination of the angular velocity of pendulum

The angular velocity of pendulum can be determine by following equation,

$$\begin{aligned} \omega &= \sqrt{\frac{g}{L}} \\ &= \sqrt{\frac{9.81}{0.4}} \\ &= 4.95 \text{ rad/sec} \end{aligned}$$

- Determination of the speed of pendulum

$$\begin{aligned} \omega &= \frac{2\pi N}{60} \\ N &= \frac{\omega \times 60}{2 \times \pi} \\ &= \frac{5.71 \times 60}{2 \times 3.14} \end{aligned}$$

$$N = 55.54 \text{ rpm}$$

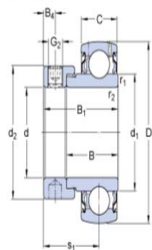
Force exerted at various angle

θ	F
1°	1.28 N
5°	6.42 N
10°	12.87 N
20°	25.94 N
30°	39.42 N

B. Bearing Data

YET 205-100

Dimensions



d	25.4	mm
D	52	mm
B ₁	31	mm
C	15	mm
d ₁	≈ 33.74	mm
d ₂	37.4	mm
B	21.5	mm
B ₄	4.75	mm
r _{1,2}	min. 0.6	mm
s ₁	23.5	mm

Calculation data

Basic dynamic load rating	C	14	kN
Basic static load rating	C ₀	7.8	kN
Fatigue load limit	P _u	0.335	kN
Limiting speed with shaft tolerance h6		7000	r/min
Calculation factor	f ₀	14	

C. Slider Crank

A Slider crank is an arm attached at right angles to a rotating shaft by which reciprocating motion is imparted to or received from the shaft. It is used to convert circular motion into

reciprocating motion, or vice versa. The arm may be a bent portion of the shaft, or a separate arm or disk attached to it. Attached to the end of the crank by a pivot is a rod, usually called a connecting rod (conrod). The end of the rod attached to the crank moves in a circular motion, while the other end is usually constrained to move in a linear sliding motion.

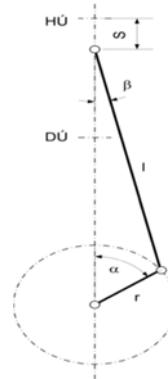


Fig. Slider Crank Mechanism

6. MANUFACTURING PROCESSES

A. Bending With Power Press Brakes:

Bending is a process by which metal can be deformed by plastically deforming the material and changing its shape. The material is stressed beyond the yield strength but below the ultimate tensile strength. The surface area of the material does not change much. Bending usually refers to deformation about one axis.

Bending is a flexible process by which many different shapes can be produced. Standard die sets are used to produce a wide variety of shapes. The material is placed on the die, and positioned in place with stops and/or gages.



Fig : Power Press

B. Electric Gas Welding:

Electro gas welding (EGW) is a continuous vertical position arc welding process developed in 1961, in which an arc is struck between a

consumable electrode and the work piece. A shielding gas is sometimes used, but pressure is not applied. In EGW, the heat of the welding arc causes the electrode and work pieces to melt and flow into the cavity between the parts being welded. This molten metal solidifies from the bottom up, joining the parts being welded together.



Fig :Electric Arc Welding Machine

C. Oxy Acetylene cutting process:

The oxy-fuel process is the most widely applied industrial thermal cutting process because it can cut thicknesses from 0.5mm to 250mm, the equipment is low cost and can be used manually or mechanized. There are several fuel gas and nozzle design options that can significantly enhance performance in terms of cut quality and cutting speed.

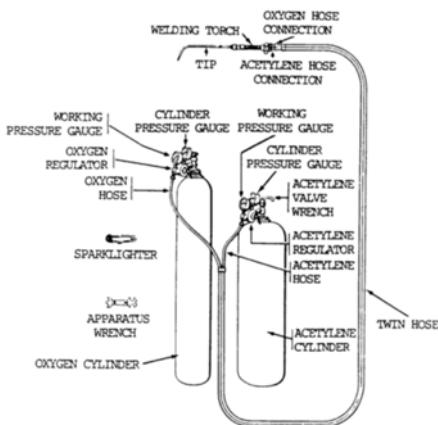


Figure 5-5. Portable oxyacetylene welding and cutting equipment.

7. ADVANTAGES

- Easy for Parents to monitor their baby.
- It can be used with all kind of baby.
- It save electricity and time because the device will stop after a period of time.
- The microcontroller is programmable.
- Its helps in keeping the baby in hygienic condition.

- This system helps parents and nurses to take care of baby without physical attension.
- Since, working is on very low voltage, Hence it does not act as a danger to the baby.

8. FUTURE SCOPE

- Automatic baby cradle can be used at hospitals.
- Useful to nanny also for caring babies.
- Convenient & affordable to working parents
- This mechanism is less power consuming so it is acceptable and affordable .
- If cradle is not in moving then by attaching gear mechanism we can produce small amount of energy.

9. CONCLUSION

- 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.

10. BIBLOGRAPHY

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