
ACUPRESSURE VIBRATING MACHINE

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ABSTRACT: *Acupressure Vibration Machine is used in Health Care Centers. It can vibrate our body & make blood circulation to remove pain & Stress There are many methods to crating vibration on machine for acupressure but the most common is by using Magnetic coils. In this project we are trying to use a different & simple method for vibration. By using the principle of unbalancing of rotary motion component we can create a good & controllable vibration. By the modification of concept available in the market, first we proceed to the design of a project. Instead of using Magnetic coils we used an electric motor with pulley to produce vibration. By the using of extra weight on pulley which mounted on electric motor, we get an eccentric motion of the pulley and because of this motion centrifugal force is developed by pulley and this force produce unbalancing of pulley and frame which results in vibration. This is the main modification of our project. Second modification is in body or frame side Design of machine is very important for this project because the large forces and vibration on the machine can be done failure or improper work of machine. So we can use a rigid body or frame for main structure with the four legs that provide better rigidity and stability to structure. We also use a rubber pad for all legs to avoid extra vibration. For producing vibration we used 2800 rpm electric motors which produce a vibration near 2 to 10 Hz. This vibration is transfer through the spring located bottom of the acupressure plate. This vibration is enough for working acupressure of human body. This vibration goes to the acupressure plate and help to*

the acupressure. We can control the vibration by the varying the weight on pulley or by the potential meter.

1. INTRODUCTION

The purpose of this project is to provide a human comfort vibration for the acupressure therapy with non-conventional method and economic way. The project is based on basic principle of vibration. By using proper vibrating frequency the acupressure therapy is works & helps to circulate blood in body and release stresses There are many methods to crating vibration on machine for acupressure but the most common is by using Magnetic coils. In this project we are trying to use a different & simple method for vibration. By using the principle of unbalancing of rotary motion component we can create a good & controllable vibration. By the modification of concept available in the market, first we proceed to the design of a project. Instead of using Magnetic coils we used a electric motor with pulley to produce vibration. By the using of extra weight on pulley which mounted on electric motor, we get an eccentric motion of the pulley and because of this motion centrifugal force is developed by pulley and this force produce unbalancing of pulley and frame which results in vibration. This is the main modification of our project. Second modification is in body or frame side. Unlikely other products available in the market using large and heavy body which is hard to transport and incompact, our project is light in weight and also with rigid construction which makes it more reliable.

2. AIM AND OBJECTIVE

AIM:- To Relieve human stresses by force vibration using acupressure vibration disk.

OBJECTIVES- To reduce the cost of our machine

3. PROBLEM SPECIFICATION

SELECTION OF MATERIAL

Several problems were faced during the selection of materials. The materials were bought according to the specifications derived from the designing software.

Availability of the materials

During the selection and purchasing of the materials several parts and screws were not available according to design to solve this issue the parts were manufactured according to design.

Loss of materials during fabrication

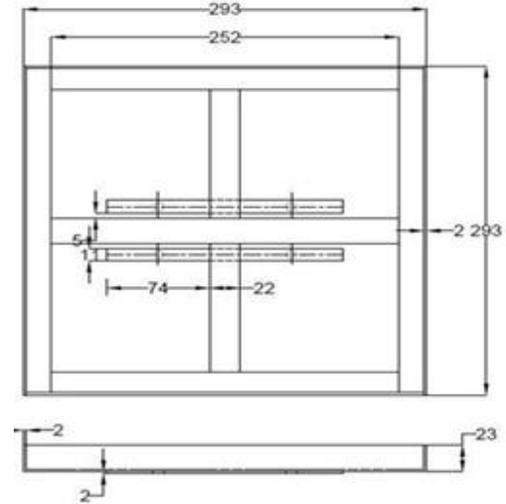
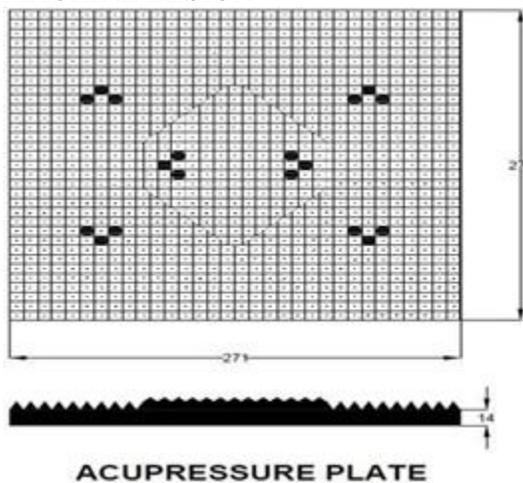
During the fabrication materials was removed resulting in the change of the dimentions of the specific part, so redesigning was done considering the machining allowance.

Improper fitting of the part

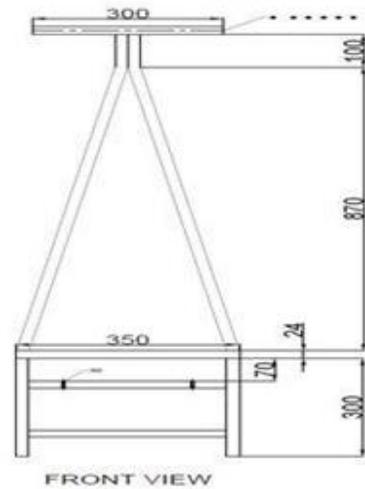
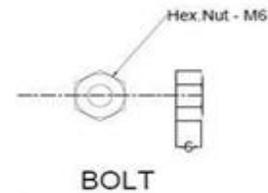
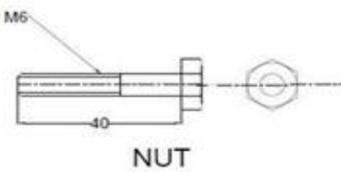
Problems were faced during the operation of machine due to the miss alignment of frame, to solve this issue re designing of the frame was done kipping the operation area of the used part.

4. DESIGN, ANALYSIS, DESIGN METHODOLOGY AND IMPLEMENTATION STRATEGY

MACHINE DESIGN



Hex Bolt - M6



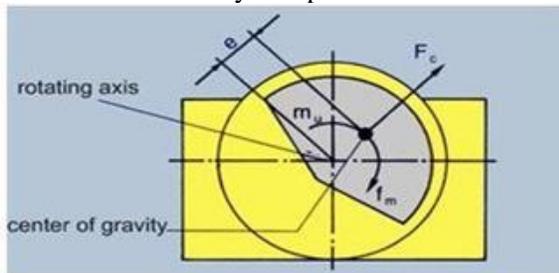
5. IMPLEMENTATION, WORKING PRINCIPLE & OPERATION

WORKING PRINCIPLE OF MACHINE

Centrifugal Force Acting

- For correct assessment and adjustment of the vibration equipment, first the calculation of the centrifugal force is necessary. It activates the motion of the every separate particle of the mass which has to be moved
- Is the centrifugal force too small, the particle will not move and will remain at its objectionable state.

Is the centrifugal force too high, e.g. for compacting undesirable motions are caused besides the necessary compaction



- To determine the centrifugal force, the mass μ of the eccentric disc, the distance e from the centre of gravity the centre of motion, and the frequency of mechanical vibration f_m are important factors.

$$F_c = \mu \cdot e \cdot \omega^2 / 1000$$

F_c – Centrifugal force in kN

μ – Mass of the eccentric disc in kg

e – Distance from the centre of gravity to the centre of motion in m

ω - Angular velocity of the rotating eccentric disc in 1/s

Calculation of the Centrifugal Force in Practice

$$F_c = m \cdot a / 1000$$

m – The sum of the masses, which has to be set into vibration, in kg:

The mass of the vibrator m_R

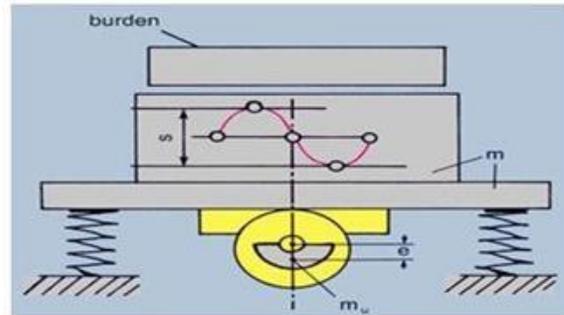
The mass of the vibration equipment m_T $m = m_R + m_T$

a – Acceleration in m/s^2

In addition a characteristic value for rigidity and the resonance behavior of the vibration equipment have to be considered.

Centrifugal Force, Amplitude, & Vibration

The centrifugal force F_c sets the entire equipment, including the mass to be vibrated, to vibration. The vibration width s (double amplitude) at the equipment must not be too high; otherwise the vibration equipment can be damaged. Should measuring of the vibration amplitude not be possible, it has to be calculated. The acceleration a is either already known or to be taken from the Standard Table



Calculation of the Amplitude $s = a / 5,483 \cdot nT^2$
 s – Vibration width (double amplitude) in mm a
 – Acceleration in m/s^2

$nT = n/1000$; n : Vibration speed 1/min

ADVANTAGES

- Machine is very simple & can be use easily.
- Simple & rigid construction.
- Long life with less maintenance.
- Compact design with easy transportation. **DISADVANTAGES**
- This machine is use for small applications
- Machines vibration is reduced when load is increase **APPLICATION**
- Use in gym for exercise purpose
- Use in home & office for exercise purpose
- Use in hospital for improving health **MAINTANANCE**
- Alignment of motor shaft
- Alignment of acupressure plate
- Painting on structure of machine

LUBRICATION

- General lubrication of motor

6. CONCLUSION

We have gained the proper frequency for the

human comfort by using the non-conventional method for this purpose. The frequency obtain by us using the eccentric motion of rotary parts principle is 3.2 Hz, which is in the range of human comfort form 2 Hz to 10Hz. The concept of our project is successes to achieve the human comfort frequency for Acupressure vibration.

REFERENCES

- [1] Heinrich Arnoldl”The recent history of the machine tool industry and the effects of technological change “University of Munich, Institute for Innovation Research and Technology Management, November 2001.
- [2] Dr. ToshimichiMoriwaki “Trends in Recent Machine Tool Technologies” Professor Department of Mechanical Engineering Kobe University, NTN Technical Review No.74(2006).
- [3] Frankfurt am Main “Multi-purpose machines ensure enhanced “, 1 January 11.
- [4] T. Moriwaki “Multi-functional machinetool”, Department of Industrial and Systems Engineering, Setsunan University, Neyagawa, Japan CIRP Annals - Manufacturing Technology DOI:10.1016/j.cirp.2008.09.004.
- [5] “Selecting and Planning the Process of Manufacture: Dr. Pulak M.Pandey.
<http://paniit.iitd.ac.in/~pmpandey>