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FABRICATION OF AUTOMATIC MOTORIZED BENCH VICE

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Abstract - A vice is nothing but a holder which has two holding points at each ends and this holding points help the work piece to stay in place so that the work car be done on the work piece. Now here one of the jaws on the vice is fixed and do not move and the other jaw that is placed in opposite moves so that we can adjust the vise according to the work piece design. So basically the first jaw of the vice helps to hold the work piece in the place and the second jaw can be used to tighten or loosen according to the shape of the work piece. So this is how the basic bench vice works. So the vise can be used for doing many works on it such as to shape a metal object, to make keys, also to cut the object etc.. Like this there are many ways for which we can use the bench vise. Now the paper basically relates to the vises and the scope of improving the working of Bench vise with the help of using a DC motor which helps in the movement of the jaws through the dc motor. Now the main objective of this paper is to make a bench vise which can be operated without any man power and use dc Motor to clamp the work piece so that the work can be done on it. The power to the movable jaw is supplied by the dc motor so that the work can be done on the work piece of any size and shape. We have also tested the vise with various work Pieces just to verify so that it can hold properly while the work is done

***Key Words*:** Vice, DC Motor, Clamp, Workpiece

1.INTRODUCTION

Design wise three sorts of vices are quite common in use namely plain vice,swivel vice and gear maker's vice which is usually referred to as bench vice. Overview our project is design and fabrication of motorized machine vice. The principle a part of the attachment main body contains electric motor with machine vice, rod, motor, joystick, and frames [1]. The machinevice and therefore the electric motor is connected with a rod through coupling. It's wont to hold the work piece with none clearance in it.Versatile machine vice by increasing the hold power through achieved by wiper motor [2-5]. A two direction switch is control the wiper motor for the clockwise and anti-clockwise rotation. Portable automatic machine vice andeasy to carry out one place to another place.

OBJECTIVE AND INNOVATION

Objective The objective of our project is to design and fabrication of automatic machine vice. All Rights Reserved Versatile machine vice by increasing the hold power through achieved by wiper motor [2-5]. A two direction switch is control the wiper motor for the clockwise and anticlockwise rotation. Portable automatic machine vice and easy to carryout one place to another place

MAIN COMPONENTS

L-Bar Frame

The frames are formed by L-shaped bars. low-carbon steel material frameare utilized in our project to construct base and a vertical column. . lowcarbon steel is very weldability. The high steel and low-carbon steel are easily weldable. M.S. L-bars is plastically deformed by more elongation

Clamps

clamp could also be a fastening device used to hold or secure objects tightly together to prevent movement or separation A through the appliance of inward pressure

L FRAME

CLAMP

Wiper Motor

Wiper motors are devices within the wiper system that functions on an influence supply so as to open and shut the jaws of the machine vice. Wiper motor might not exceed 60 watts[12 v and 5 A]. It is widely used in automobile such as four wheeler, three wheeler, bus, truck, and van etc. Watts may range depending on the application(.this motor is is slow revolution .it's has around 50 RMP speed for designing like slow processingand smooth pupose

Shaft

The shaft is formed from low-carbon steel which connects the electric motor spindle Research and Development in Machine Design Volume 3 Issue 3 and therefore the bench vice

Forward Reverse Switch

It is also referred to as two directions or reverse switch. It changes the electrical flow in both the forward and backward direction

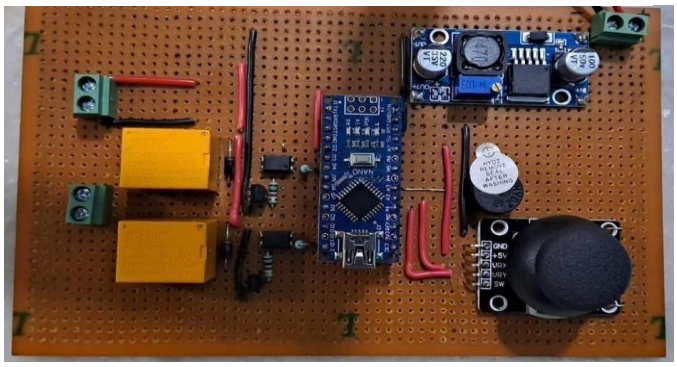
Circuit Board

It is also known as a printed circuit board (PCB), is a thin plate on which chips and other electronic components are placed. Computers, radios, televisions, and other

electronic devices containone or more circuit boards.

When the stick was moved upward:

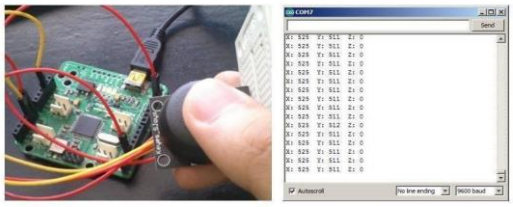
When the stick was moved to the left:



Description Lots of robotic projects need a joystick. This module offers an affordable solution to that. The Joystick module is similar to analog joysticks found in gamepads. It is made by mounting two potentiometers at a 90 degrees angle. The potentiometers are connected to a short stick centered by springs.

TESTING

When the middle button was pressed:



When the stick was moved downward:

ARDUINO NANO

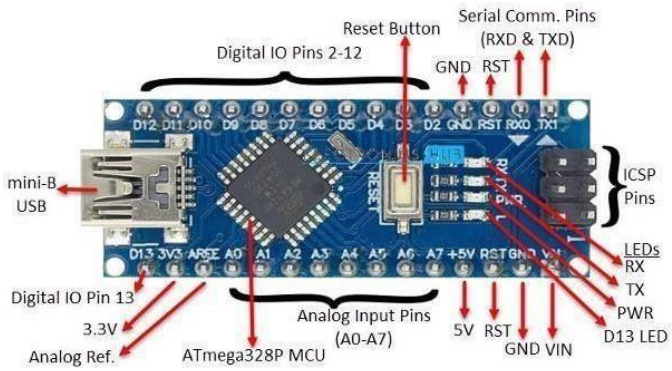
Arduino is a tool for making computers that can sense and control more of the physical world than your desktop computer. It's an open-source physical computing platform based on a simple microcontroller board, and a development environment for writing software for the board.

Arduino can be used to develop interactive objects, taking inputs from a variety of switches or sensors, and controlling a variety of lights, motors,and other physical outputs.

ARDUINO NANO

Arduino Nano Board

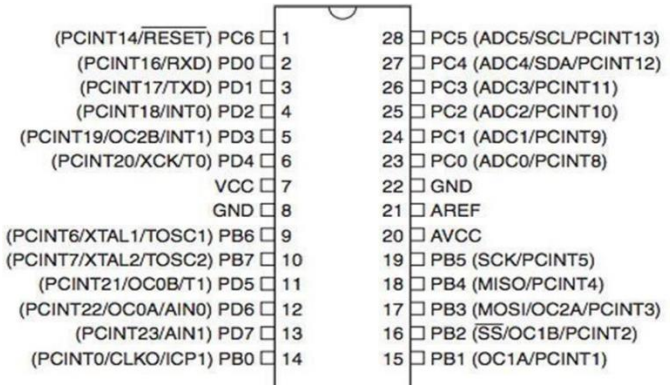
Arduino projects can be stand-alone, or they can communicate with software running on yourcomputer (e.g. Flash, Processing, Max MSP.) Theboards can be assembled by hand or purchased preassembled; the opensource IDE can be downloaded for free



Arduino Nano Specifications

The Arduino programming language is an implementation of Wiring, asimilar physical computing platform, which is based on the Processingmultimedia programming environment.There are many other microcontrollers and microcontroller platforms available for physical computing. Parallax Basic Stamp, Netmedia's BX-24, Phidgets, MIT's Handyboard, and many others offer similar functionality.All of these tools take the messy details of microcontroller programming and wrap it up in an easy-to-use package. Arduino also simplifies the process of working with microcontrollers, but it offers some advantage for teachers, students, and interested amateurs over other systems.

Inexpensive - Arduino boards are relatively inexpensive compared to other microcontroller platforms. The least expensive version of the Arduinomodule can be assembled by hand, and even the pre-assembled Arduino modules cost less than Rs.500/-Cross-platform - The Arduino software runs on Windows, MacintoshOSX, and Linux operating systems. Most microcontroller systems are limited to Windows.Simple, clear programming environment - The Arduino programm environment is easy-to-use for beginners, yet flexible enough for advancedusers to take advantage of as well. For teachers, it's conveniently based on the Processing programming environment, so students learning to program in that environment will be familiar with the look and feel of Arduino. Open source and extensible software- The Arduino software is published as open source tools, available for extension by experienced programmers. The language can be expanded through C++ libraries, and people wanting to understand the technical details can make the leap from Arduino to the AVR C programming language on which it's based. Similarly, you can add AVR-C code directly into your Arduino programs if you want to.Open source and extensible hardware - The Arduino is based on Atmel's ATMEGA8 and ATMEGA168 microcontrollers. The plans for the modules are published under a Creative Commons license, so experienced circuit designers can make their own version of the module, extending it and improving it. Even relatively inexperienced users can build the breadboard version of the module in order to understand how it works andsave money



INTRODUCTION ARDUINO NANO:

The Arduino Uno can be programmed with the Arduino software. The ATmega328 on the Arduino Uno comes pre burned with a boot loader that allows you to upload new code to it without the use of an external hardware programmer. It communicates using the original STK500 protocol (reference, C header files).We can also bypass the boot loader and program the microcontroller through the ICSP (In-Circuit Serial Programming) header; see these instructions for details.

The ATmega16U2 (or 8U2 in the rev1 and rev2 boards) firmware source code is available. The ATmega16U2/8U2 is loaded with a DFU boot loader, which can be activated by:

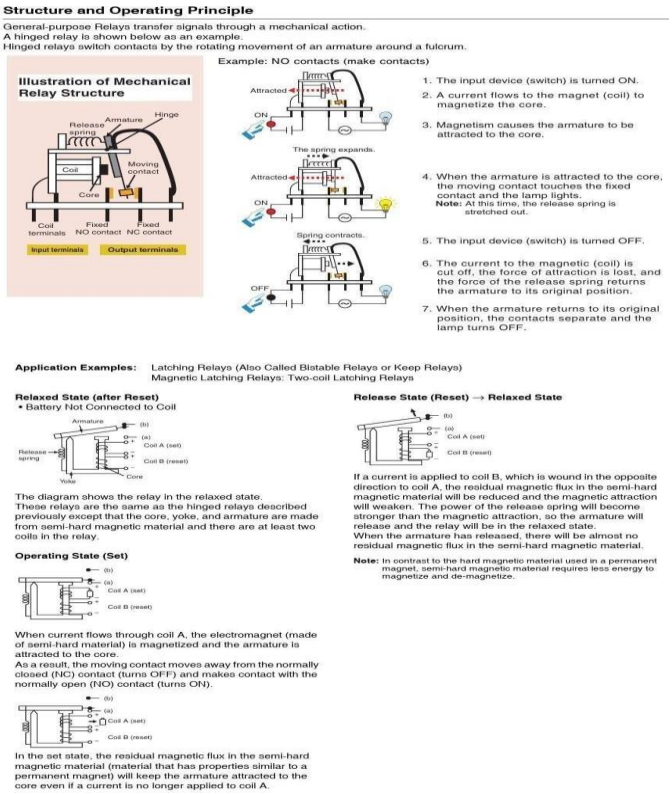
- On Rev1 boards: connecting the solder jumper on the back of the board (near the map of Italy) and then resetting the 8U2.
- On Rev2 or later boards: there is a resistor that pulling the 8U2/16U2 HWB line to ground, making it easier to put into DFU mode.

We can then use Atmel's FLIP software (Windows) or the DFU programmer (Mac OS X and Linux) to load a new firmware. Or you can use the ISP header with an external programmer (overwriting the DFU boot loader)See this user-contributed tutorial for more information.

INTERFACE::

ARDUINO BLUETOOTH CONTROLLER APPLICATION

This android application can establish a connection with any Arduino/microcontroller project that involves a bluetooth module! It allows the user to set a UUID of his own bluetooth module in order to connect the android application with his projects!!! The default UUID that comes with this application is for the HC-06 Wireless Serial 4 Pin Bluetooth RF Transceiver Module RS232. (If you use default UUID in order to pair the BT module with your smartphone for the first time, you will have to give a 4-digit password. This password is '1234'.) The following images represent the way the bluetooth needs to be connected and later the operation procedure to be followed. The steps for the connecting the bluetooth and making the robot work is explained in detail in the further part of the description. As of now, the images depict the basic working of the application that need to adapted for the pairing of the bluetooth with the robot and later selectingthe mode of operation for the controlling the robot.



DESIGN SPECIFICATIONS OF PARTS.

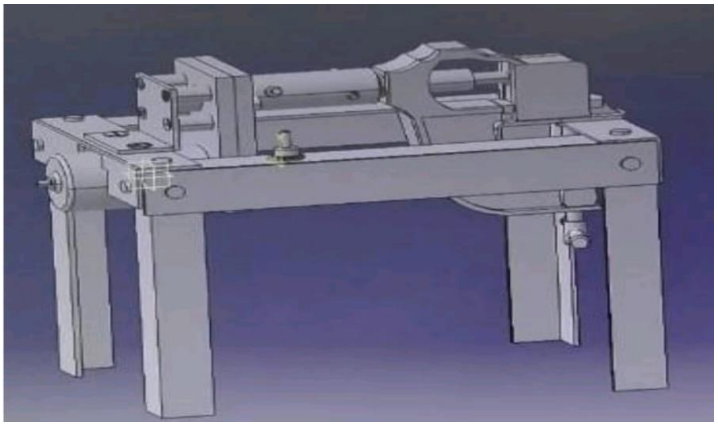
VICE
Material:Alloy steel
Dimensions:15*10*5(length* width* height)in CM
Weight:5.9 KG

FRAME
Length of the frame 45 CM
Height of the frame 30CM
Width of the frame 25 CM
Material :cast iron

MOTOR
Power 60 watts
Speed of the motor 55RPM

SMPS (switch mode power supply)
Volts supply 12 ,Power supply 5 A
Power supply 60 watts

Design Methodology of Bench Vice in Catia Software:



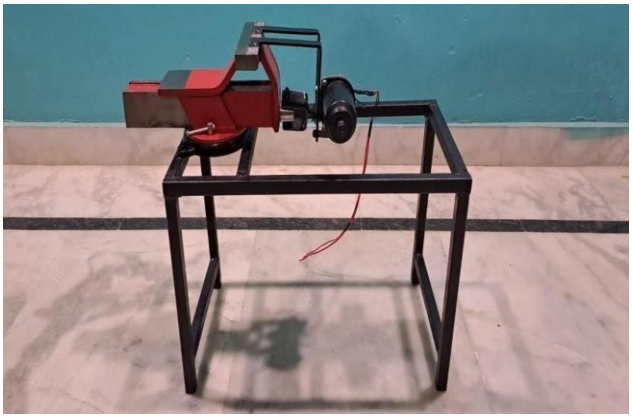
Catia model of bench vice

FABRICATION PROCESS

PROCESS

1. Take a frame with specific dimensions of 150 mm. by using processing of welding,grinding and painting. Its opertions are used for finishing purposes.
2. Now the vice is mounted on the desire position on the frame, fixed with using nut and botls.and fixed rigidly to the frame .
3. then the mounted vice is connected to the motor through the coupling like universal coupling .it may transfer the mechanisam to the shaft of the vice. It may lead the positions of the jaws.
4. L clamp is made up of cast iron it should be used for supporting the components.it should be placed between the motor and vice jaw by suppoting the motor
5. Smps (switch mode power supply)it is ued to alternative current to direct current(AC to DC).it regulates to flow of current perfectly.it is placed left inside of the frame .
6. circuit board is the combinantion of lm 2596,Arduino,relay etc..this board is mainly transferred electricity to the motor and signal to joystick by controlling positions.these are placed side by side at the left end inside of the frame .
7. Joystick is position controller of the vice jaws.and it responsible for the clock and anti clock wise directions of the motor.and it isfixed at the top ofthe frame.and is placed behind the motor and top of the circuit board.

PROCESSING IMAGES



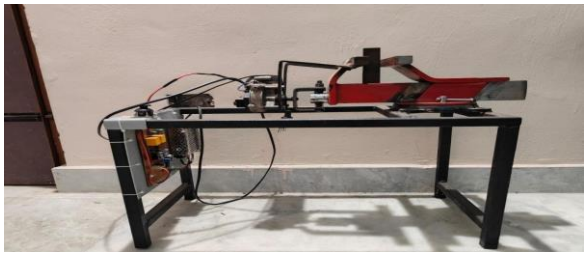
STEPS INVOVED IN WORKING OF MOTORIZED BENCH VICE

Electrical supply from power source

1. This electric current should be paseed through the SMPS (switch modepower supply)it is a 12 volts and 5 amps to 60 watts convertion .
2. SMPS converts DC TO AC or AC TO DC and to change the voltage to theappropriate range to the system. The supplied current is now transferd to the CIRCUIT BOARD .
3. The power of the board is passed to the LM 2596 .it supplies the powerto the motor with respective of load.
4. Its normal load capacity is 20watts up to 30 watts. when load excess morethan 30 watts it can reset the motor. .after restart the motor some of the extraamount of the force can acted.it should be connected to the Arduino nano controller.
5. Arduino is a microcontroller. It can lead the control the way of the buttonsystem of the joystick.it can be programmed by the programming system.
6. The Arduino is connected to the joystick .it main purpose is to controlledthe direction of the motor (CLOCK WISE OR ANTICLOCK WISE).
7. Normal value of the joystick is 500.Less than 500 takes the ANTICLOCK WISE ,More than the 500 is takes the CLOCK WISE DIRECTION.It can be controlled by thumb.
8. The signals are passed to motor via RELAY .it is used for leading thedirections of the motor.

3. CONCLUSIONS

This is a motor operated vise which may move in back and forth direction won't to hold the thing tightly to try to any operation on the thing. This is often a motorized vice which **reduce our time and energy** in its operation. We propose a motor operated vise which when switched on may stiffen to carry the work piece (as well as loosen up). It's a motorized vice when operated reduces our time and energy. Joystick switch is employed to regulate the direction of rotation of motor shaft as per the workers requirement.It plays a major part in fabrication work and is frequently used. We propose a motor operated bench vise which can tighten up to hold thework piece (as well as loosen up) by just pressing the switch. It is a motorized vice which reduces our time and effort in its operation.



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