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Design and Fabrication of Mini Belt Grinder Machine

Mr. Hanumanta Narayanrao Balpande, Mr. Akash Vasantrao Bagul, Mr. Hemantkumar Madhu Meshram, Mr. Vinod Lalchand Rahangdale

Dr. Babasaheb Ambedkar Technological University Lonere, Mechanical Engg.

ABSTRACT

In our project the work abrasive belt is used to grinding the material. The abrasive belt is rotated by the single phase induction motor. Hence our project namely abrasive belt grinder is a Special type of Machine. According to the type of material to be grind, the grinding tool can be changed. This project gives details of grinding various shapes and sizes of components. This machine can be widely applied in almost all type of industries. By varying the pulley sizes I can get a high end speed of over 10,000 rpm if needed.

Keywords: Abrasive belt, Grinding paper, Nylon Pulley, Motor.

INTRODUCTION

Our project is design and fabrication of Multi Use abrasive belt Grinder. It is used to grind the machining surfaces to super Finish and accuracy. It can be used as an external Grinder by fixing the belt grinder attachment on the conveyor roller. Abrasive belt grinding is a common finishing process in the metal and wood working industries. Coated abrasive belts are used in the same speed range as bonded wheels, but they are not generally dressed when the abrasive becomes dull. Abrasive belt grinding is a kind of grinding tool with special form, which needs straining device and driving wheel and to make abrasive belt strained and moved at high speed, and under certain pressure, the contact between abrasive belt and work piece surface can help to realize the whole process of grinding and machining. Belt grinding is a rough machining procedure utilized on wood and different materials. It is commonly utilized as a completing procedure in industry. A belt, covered in rough material, is kept running over the surface to be handled so as to evacuate material or create the ideal finish. This Belt Grinder machine is designed on a CAD software. It consists of 775 HP motor which is fundamentally rotates the pulley attached to it, along with a mini grinder, grinding paper and an abrasive belt grinder. The second pulley is attached to the wooden base vertically with the tensioner spring. Grinding paper is then fitted in pulley. To support the mini grinder a base frame is provided, it helps in grinding wooden material. Machine is designed using DC motor, spring, base Frame (support frame), abrasive grinder belt, coupling and a pulley. This machine helps to shape the material without putting much effort and getting better surface finish, and also getting larger area of belt for grinding operation than wheel grinding.

OBJECTIVES

To cater to the issue of competition in the mechanical industry the need for automation is assessed by all the industry. To identify the key policy avenues considered to be appropriate to meet the challenge of sustainable manufacturing and packaging industry for the future. To provide alternatives for industries aiming toward reducing human effort and improvement in material handling systems by implementing automation. Sustainable and practical automation solutions for the future industry environment.

COMPONENTS REQUIRED

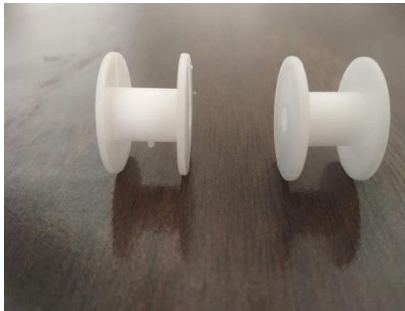
1. 12V DC RS 775 Motor



2. SMPS 12V 5A



3. Nylon Pulley



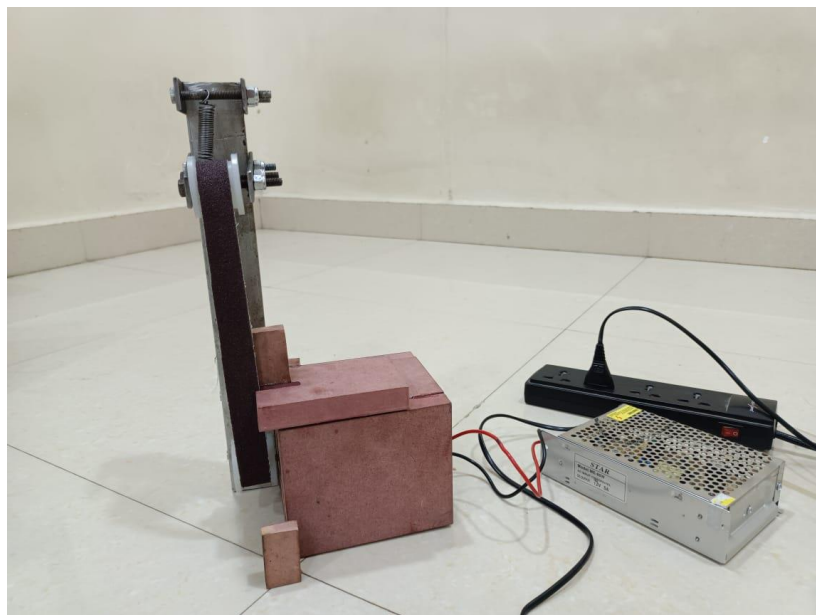
4. Abrasive Belt



WORKING PRINCIPLE

In our project consist of end bearings with bearing cap, roller wheel, shaft, single phase induction motor and abrasive belt. This whole arrangement is fixed on the frame structure where the component rests.

The roller wheel is mounted on the two end bearings with bearing cap by suitable arrangement. There are two roller wheel is used in our project to rotate the abrasive belt. One side of the roller wheel shaft, one v-pulley is coupled by the suitable arrangement. The single phase induction motor with V-pulley arrangement is used to rotate the abrasive belt through the belt drive mechanism. This Belt Grinder project is made from wood. This Mini grinder Project consists of 775 motor which is fundamentally rotates the pulley attached to it, along with a mini grinder, grinding paper and an abrasive belt grinder. The second pulley is attached to the wooden base vertically with the tensioner spring. Grinding paper is then fitted in pulley.



RESULT AND DISSCUSSION

This Belt Grinder machine is designed on a Solidworks software. It consists of 775 HP motor which is fundamentally rotates the pulley attached to it, along with a mini grinder, grinding paper and an abrasive belt grinder. The second pulley is attached to the wooden base vertically with the tensioner spring. Grinding paper is then fitted in pulley. To support the mini grinder a wooden base frame is provided, it helps in grinding wooden material. The project is working properly and the mechanism is successfully achieved.

ADVANTAGES

The gridding can be varied according to our needs. It is portable. Simple in construction. Less maintenance. The machine is compact and rigid in size. The machine is compact and rigid in size. It can be used on any place of small grinding application. By varying the pulley diameter the speed of the abrasive belt to be changed.

APPLICATIONS

Grinding outside the job in any size of body can be done. As the feed is given automatic, 0.8 micron finish may be achieved. By changing the grades of abrasive belt grinding it can be used to grind the carbon steel, Alloy steel and stainless steel etc.

FUTURE SCOPE

As we know that Mini Belt Grinder is project used for Belt grinding, which is a rough machining procedure utilized on wood and different materials. It is commonly utilized as a completing procedure in industry. A belt, covered in rough material, is kept running over the surface to be handled so as to evacuate material or create the ideal finish. This Belt Grinder project is made from wood. This Mini grinder Project consists of 775 motor which is fundamentally rotates the pulley attached to it, along with a mini grinder, grinding paper and an abrasive belt grinder. In future we can replace the motor input with solar energy that it can be efficient, low cost operation.

CONCLUSION

A wide variety of machines are used for grinding. Although mini belt grinding abrasive belt have stronger cutting ability than that on the grinding wheel. But as wheel grinding is having some disadvantages in form of time required to finish the surface, material removal rate, surface finish obtained etc. To overcome such disadvantages this vertical abrasive belt grinding machine is designed using Solid works software to overcome disadvantages of wheel grinding machine. Also this machine helps to grind or to finish the surface using abrasive belts which to be mounted on this designed machine. Due to this, abrasive belt used maximum area of belt is comes in contact with work piece due to which material removal rate or surface finish rate is more in less time as compared to wheel grinding machine.

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