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DESIGN OF SEMI FLEXIBLE DRILLING MACHINE

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Abstract

In fundamental boring machines, there is an issue of impediment of development of penetrating machine in various ways. Additionally there are issues of less space between boring apparatus and work and arrangement issues. We can conquer these issues with the assistance of a 360 degree adaptable penetrating machine. It tends to be mounted on a level surface and can be turned toward any path vertical, flat, here and there. So that employment setting activity isn't confounded. The brad point boring apparatus streamlines the cycle while boring wood. It diminishes the setting time for the activity. Materials like wood, plastic and light metals can be bored with this machine.

INTRODUCTION

Penetrating is a cutting cycle where an opening is begun or expanded by methods for a multipoint, fluted, end cutting apparatus. As the drill is turned and progressed into the work piece, material is eliminated as chips that move along fluted shank of drill. Process characteristics:Uses a multipoint, fluted, end cutting device Cutting tools are rotated and advanced relative to each other .Creates or enlarges no precision holes May produce coarse, helical feedmarks, depending on machining parameters .Creates small burrs on entry and coarse burrson exit.

PROCESS SCHEMATIC

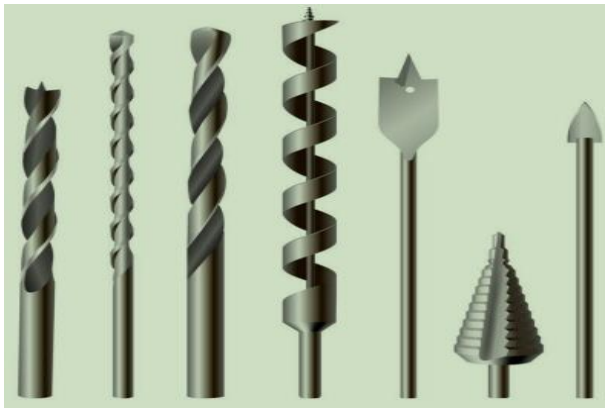

Figure-1 Dril bits

The bottle filling process begins with the client input given through the console. The user input is fed into the micro-controller. The microcontroller triggers the dc engine drive circuit. This switches on the DC servo engine. The transport framework begins moving until the IR sensor identifies the nearness of containers, along these lines halting the chain transport.

The IR sensor is capacitive in nature and triggers the small scale controller to incite the solenoid valve, switch off the engine and energies the valve to fill the fluid. At the point when the necessary volume is filled, the MSP430 controller removes the excitation current to the solenoid valve and at the same time turns over the dc engine. Consequently, a similar procedure rehashes for the filling of the next containers until the batch amount is fulfilled.

Drill Bits:. Drill bits come in many sizes and shapes and can create different kinds of holes in many different materials. In order to create holes drill bits are usually attached to a drill, which powers them to cut through the work piece, typically by rotation. The drill will grasp the upper end of a bit called the shank in the chuck. Drill bits come in standard sizes, described in the drill bit sizes article. A comprehensive drill bit and tap sizechart lists metric and imperial sized drill bits alongside the required screw tap sizes. There are also certain specialized drill bits that can create holes with a non-circular cross- section

BRAD POINT DRILL BIT:

Description:. Metalwork, this is countered by drilling a pilot whole a spotting drill bit. In wood, the lip and spur drill bit is another solution: The centre of the drill bit is given not the straight chisel of the twist drill bit, but a spur with a sharp point and four sharp corners to cut the wood. The sharp point of the spur simply pushes into the soft wood to keep the drill bit inline.

ADVANTAGES OF BRAD POINT DRILL BIT:

An ordinary twist drill bit shears the edges of the hole cleanly. Wood drilled across the grain has long strands of wood fiber. These long strands tend to pull out of the wood hole, rather than being cleanly cut at the hole edge. The lip and spur drill bit has the outside corner of the cutting edges leading, so that it cuts the periphery of the hole before the inner parts of the cutting edges plane off the base of the hole. By cutting the periphery first, the lip maximizes the chance that the fibers can be cut cleanly, rather than having them pull messily out of the timber.

1. Lip and spur drill bits are also effective in soft plastic. Conventional twist drill bits in a hand drill, where the hole axis is not maintained throughout the operation, have a tendency to smear the edges of the hole through side friction as the drill bitvibrates.
2. Brad point tip provides accurate positioning for starting the hole. Spur cutting edges reduce splintering and ensure a smooth, cleanhole.

Figure-2 Cad Model Semi Flexible Drilling Machine

Figure-2 Mechanical Model Semi Flexible Drilling Machine

CONSTRUCTION AND COMPONENTS:

Up/Down and rotating mechanism is available in this Drilling Machine. One end of the arm is attached to a firm base while the other has a tool. These arms are made up of Aluminum. The number of parameters in the subgroup is called the degrees of freedom of the joint. Mechanical linkages are usually designed to transform a given input force and movement into a desired output force and movement.

Motor-It rotates shaft (which is supported by bush) when power is supplied through rectifier. This shaft is connected with drill bit through chuck to rotate drill bit and makes hole on work piece when it is required.

Connecting rod-It connects the two Frames to each other for support between them and to help move when required. It consists of metal strips of two sizes one of 12" (inch) and another is of 15" (inch). Both are of four pieces of equal length.

Pulleys-A set of pulleys are assembled so that they rotate independently on the same axle to form a block. Two blocks with a rope are attached to one of the blocks and threaded through the two sets of pulleys to form a block and tackle.

Bearing-The bearings constrains relative motion to only the desired motion, and reduces friction between moving parts Screws-A screw joint is a one-degree-of-freedom kinematic pair used in mechanisms. Screw joints provide single-axis translation by utilizing the threads of the threaded rod to provide such translation

SPECIFICATIONS:

Motor:

Type -DC
Rated voltage-24v
Working voltage-12v
Speed-10000 rpm
Diameter -36mm
Length -57mm
Current- 0.2amp-1.2amp
Power – 2.4watt-15watt
Shaft diameter-3.17mm
Shaft length- 14mm
Material – aluminum Color- black

Drill chuck:

Outside diameter- 21mm
Clamping range- 0.3mm-4mm
Taper-6mm

Drill bit:

Type-brad point bit
Diameter-3mm
Length -60mm
Material-HSS.

CUTTING PARAMETERS:

A. *Cutting Speed (V) :*
$V = \pi DN$ N=1750
V=274.88 mm/sec

B. *Feed Rate (f):*
40 mm/min

C. *Depth of Cut (d):*
d=D/2 d=1.5

D. *Material Removal Rate:*
MRR = $(\pi D*D/4)f$ N MRR =494800.84

E. *Machining Time:*
t = L/f

P = 15 watts , N = 1750 rpm

$P = 2\pi NT/60$

$T = P \times 60/2\pi N$

$T = 15 \times 60/2\pi \times 1750$ T = 81.8511 N-mm

CONCLUSION

The 360 degree drilling machine gives effective drilling operation and rotates in 360 degree direction. It is economical and has less handling cost and manufacturing cost. It is highly efficient compared to other units.

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