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FABRICATION OF SIMULTANEOUS DRILLING AND GRINDING MACHINE

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Abstract— ***In present days worldwide industrial sectors are done drilling and grinding operations with separate machines. So we can invent the fabrication of simultaneous drilling and grinding machine. This machine is mainly designed for simultaneously drilling and grinding operations, this machine is runs with bevel gear mechanism. Bevel gears are attached to the AC motor rotating shaft with help of bush rod like differential manner, electric power is needed for drilling operation. Already stepped pulley and bevel gear is fixed on AC motor rotating shaft. Now power is transmitting motor pulley to drilling machine pulley through the belt. Grinding operation can be done on both sides, one is clock-wise direction and another one is anti-clock wise direction. This machine is mainly used in production industries and domestic purpose.***

Keywords— ***Bevel gear mechanism, AC motor, Drilling, Grinding, Pedestal bearings.***

I. INTRODUCTION

The reason to design a fabrication of simultaneous drilling and grinding machine is that there is no machines which can perform various operations i.e. drilling and grinding at the same time. This machine is operated by AC motor and uses a bevel gear mechanism this machine may be used in industries and domestic purpose , this machine can done metal and non-metal. This project work is proposed where a machine is designed which can perform operations namely drilling and grinding different working centres simultaneously. It implies that manufacturer need not pay for machine performing above tasks individually.

II. PROBLEM STATEMENT

This machine can be done simultaneous operations at the same time with required speed and this machine is automatic which is controlled and operated by motor and run with the help of current. This machine is based on the mechanism of Bevel gear arrangement like differential manner.

Working principle

Basic principle for drilling

The work table which holds the work piece rigidly in position. The rotating edge of the drill exerts a large force on the work piece and the hole is generated. The removal of metal in a drilling operation is by shearing and extrusion.

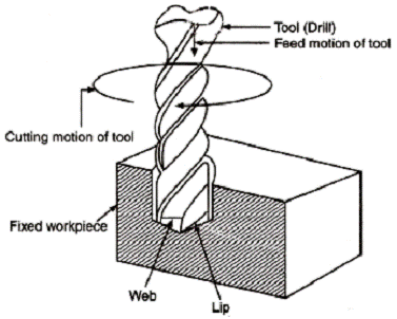

Fig .1 drill bit

Basic principle for grinding

These grains of abrasive material i.e. grits will have sharp edges or points with enough hardness as compared to work piece surface hardness and wear resistance and these grits will act as cutting tool in process of grinding to remove small-small particles from work piece surface.

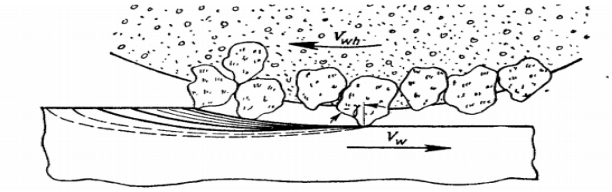

Fig.2 Basic grinding principle

III. EXPERIMENTAL WORK

The fabrication of simultaneous drilling and grinding machine, This machine is based on the mechanism of bevel gear arrangement like differential manner. The different machining operations can be done in separate machines for individual operations. This kind of machines high expenses, more space required it can take more time. But the fabrication of simultaneous drilling and grinding machine, which contains two operations in a single machine. The operations are namely drilling and grinding. It is a new concept specially meant to reduce the work time and save the cost.

Machine components

The main components used in this machine:

AC Motor

The AC(alternating current) motor is a electric motor driven by the alternating current. This AC motor is mainly two basic parts, a outside stator with produce a rotating magnetic field , and inside rotor magnetic field may be produced by a permanent magnets.

Fig.3 General view of AC motor

Specifications of the motor:

Power	**0.5 hp**
Speed	**1440 r.p.m**
Voltage	**220 V**
Type of motor	**1-Ø AC motor**
Frequency	**50 Hz**

Table 1: Motor specifications

Bevel gears

Bevel gears are mainly used for changing the axis of rotation i.e. horizontal axis to vertical axis . these bevel gears are having 22 teeth .

Fig. 4 bevel gears

Grinding wheel

The grinding wheel is having abrasive particles, the various grinding wheels are available in the market i.e. smooth, medium and rough grinding wheels. We taken the rough grinding wheel, grinding wheel is used for mainly surface finishing process and metal removal process.

Fig.5 Grinding wheel

Stepped v-type pulleys

Stepped v-type pulleys are mainly having v-type grooves are having . pulleys are mainly used for transmitting the power one shaft to another shaft through the belt.

Fig.6 Stepped pulley

Preparation of bottom circular plate

The circular supporting plate is used for supporting of the above all components. Marking of three holes with center punch I can drill the three holes for the fixing purpose with the fixing of nut and bolts.

Fig.7 Preparation of drilling

Preparation of bottom base

The bottom base is supporting of all components, remaining all components are mounted on the base. This base is prepared for the material is choose iron and mixing of other alloys so it is well strength of supporting. First set the measurement to the base plate and marking of the perfect dimensions.

Fig.8 Surface finishing on base

Block diagram of the machine

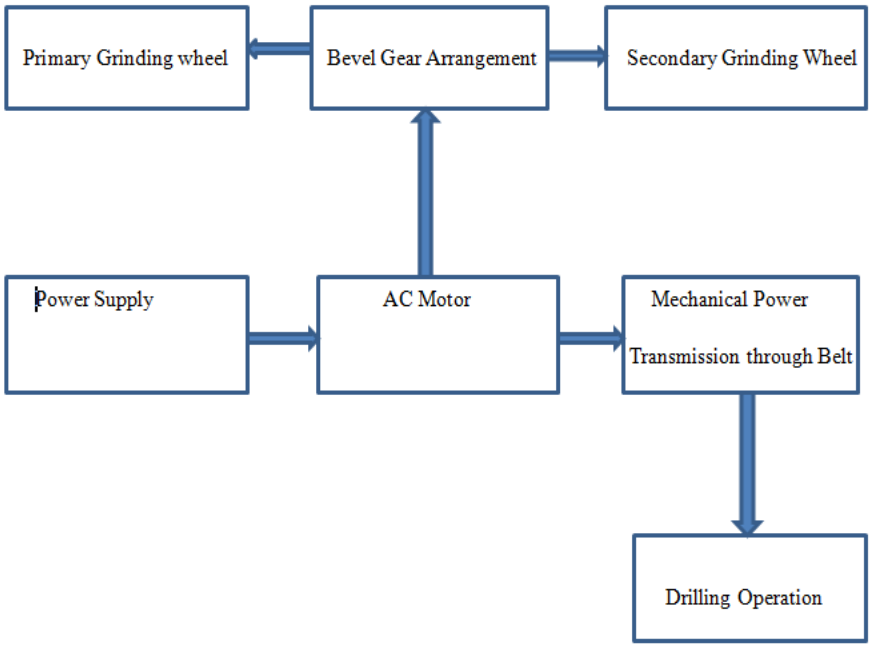

Fig.9 Block diagram of the machine

Working of the machine

First the power supply 220V is given to the motor because this motor is single-phase motor it can be rotated clock-wise direction speed of 1440 rpm automatically bevel gear arrangement stepped pulley also rotate because we attached the both bevel gears and stepped pulley is rotated.

Fig.10 Total assemble of the machine

The stepped pulley rotating we can transfer the mechanical power driver pulley to driven pulley (i.e. drilling) through belt, So drilling shaft is rotated now we can drill any type of material .In drilling operation manual feeding is required in the drilling operation so rack and pinion mechanism in the drilling setup . Now we can drill by using manual feeing slowly finally we have done the drilling operation.

The bevel gear is also rotated clock-wise direction so the bevel gear mechanism is attached to the AC motor shaft like differential manner, The bevel gear is rotated clock-wise direction so one bevel gear is rotated clock- wise direction another bevel gear is anti-clock wise direction.

COST ANALYSIS

S.no.	Particulars	Total quantity	Cost Rs/unit	Total cost
1	AC Motor	1	4000	4000
2	Pillow block bearings	4	150	600
3	Bevel gears	4	450	1800
4	Stepped pulley	1	500	500
5	Iron shaft	4 Kg	40	160
6	Circular plate	1 Kg	40	40
7	Rectangular bar	4 Kg	40	160
8	Spring	1	30	30
9	Bolt and nuts	20	10	200
10	V-type belt	1	100	100
11	Iron sheet	10 Kg	40	400
12	Drill bit	1	170	170
13	Drill chuck	1	370	370
14	Drilling machine other components	-	2000	2000
15	Electric cable	1	50	50
16	Welding works	-	600	600
17	Grinding wheels	3	50	150
18	Other parts machining cost	-	600	600
19	Transportation and miscellaneous	-	1000	1000
TOTAL				12930/-

Table :2 Cost analysis

IV. CONCLUSION

The main aim of every production industries are mainly based on minimise the production cost and increase the production rate , so now we can invent fabrication of simultaneous drilling and grinding machine. This machine is mainly useful in large scale industries and domestic purpose, in this project we can reduce mainly power consumption , floor space as well as we can reduce cost. We don't want to invest the separate machines for individual operations , finally we can get the fabrication of simultaneous drilling and grinding machine , we can perform drilling and grinding operations simultaneously with required speed.

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