

Automated Mechanism for Retrieval of Spectrocoin Sample from Copper Die

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Abstract--- Our project is designed to fabricate the automated mechanism for retrieval of spectrocoin sample from the copper die. The main objective of this project is to design the copper die with a pneumatic connection in easier way to obtain the spectrocoin. At present in industries they use manual connectors for joining the two copper die so that the molten metal can be poured into the copper die. After some time interval removing the copper die the molten metal poured in a die is obtained like a metal coin then it is chilled by dropping it into the water container. After few minutes the coin is been taken and grinded on both the surface then they analyze in the atomic spectrocoin analyzer by passing argon gas in the coin the spark is obtained is analyzed by the analyzer software and gives the metal composition of the material in percentage. The problem of loading and unloading consumes more time. Which the coin is identified as problem and we suggested the solution in this project. Now we have design the alternative by opening and closing of copper die by connecting them with an pneumatic cylinder controlled setup hand lever the air is passed through the cylinder the copper die starts working it is controlled by ON/OFF by manually operated lever ejector. By pushing the ejector the coin directly falls into the water tank sump later it can be grinded and analyzed to find out the composition of materials.

In the metals through our design the loading and unloading of coin is made easy for the operators and reduces time drastically.

Keywords--- spectrocoin, spectrocoin accuracy, copper die.

I. INTRODUCTION

The metal casting industry plays a key role in all the major sectors of our economy. There are castings in locomotives, cars, trucks, aircraft, factories, and everywhere. Metal casting is one of the oldest manufacturing methods. In metal casting, metal is melted and poured into a cavity and after solidification of the metal in the cavity; the metal takes the exact shape of the cavity. The solidified object is then taken out from the cavity either by breaking the cavity or taking the cavity apart. The solidified object is called the casting. The cavity is also known as mould. The shape and size of the mould matches with the product requirement. However, depending upon the shape complexity and the metal the size of the mould may differ with the size of the product requirement. The mould into which the molten metal is poured is made of heat resistant material. Sand, being the heat resistant, is the most often used material for making the mould. However, permanent mould made of metal can also be used to cast various products. This process allows to produce the complex parts in one go.

Metal casting process is the oldest manufacturing process. Metal cast products find their application in most of the application product and almost all automobile product use cast product (s) as its component. It can be said

that Foundry industry is the mother of all industries. In India, there are around 5100 foundries both large as well small units registered in India. Of these, around 3000 units are grey iron foundries, producing about 5.1 million tons of grey iron casting. About 300 foundries are in the large sector. Out of total units, 80 percent are small units, 15 percent are medium- size and only 5 percent are in large sector. In India the scope of metal casting industry is increasing as the government has made tremendous efforts to improve infrastructure including power generation. The efforts will help metal casting industries, which are power intensive industries, to grow. The knowledge and application of technology in the area of metal casting will help the industries to excel in all of its application areas. The scope of metal casting industry has widen up. It is now-a-days not limited to metal products, but the application of cast product also include, plastic products, composite, civil and building infrastructure development, bridge construction etc. The new initiatives and additional scope of foundry industry will require the skilled manpower in this field.

The Present Challenges to Indian Metal Casting Industries

- The high cost of technology and related modern equipment.
- The cost of energy, which is increasing every time.
- High rate of interest on loans.
- Industry and Taxation law policies have become a barrier in the growth and export business.

[1] Irregular supply of raw material.

[2] Environment Pollution.

The Focus of Metal Casting Industries must be on

- Quality not on the quantity with a spirit of producing right first time and every time waste reduction and on improving the productivity
- Defect prevention not on defect rectification
- Competition on pricing as well
- Reduction in lead time. there should not be any tolerance on defects or defectives or Delays.

Improving the quality of spectrocoin sample,

Quality is the main aspect for improving the material composition standards, we have taken up this topic for improvising the accuracy of the spectrocoin to get a better results in material by,

- Replacing the copper die with new design.
- Replacing the C-CLAMP .
- Connecting the copper die with pneumatic setup.
- Pneumatic cylinder and operating valve gives smooth operations.
- Retrieval of spectrocoin sample is easier by using the latest technology.
- There will be no damages to the copper die and spectrocoin sample.



Manually operated c- clamp

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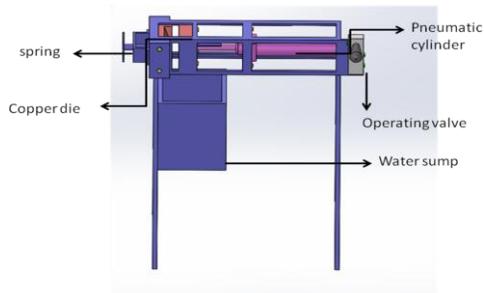
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II. COMPONENTS USED

Copper die, pneumatic cylinder, operating valve, spring,ms-plate, ss-rod, onetouchfitting, tubes ,air-compressor, fasteners are the components used to fabricate the machine .

III. DESIGN



IV. FABRICATION



S.no	Part name	Quantity
1	Pneumatic cylinder	1
2	Operating valve	1
3	One touch fittings	4

V. SPECIFICATIONS

- Pneumatic cylinder 100 mm stroke, 10 BAR pressure.
- Operating valve 5/2 Way 1/4" Manual Lever Actuator Pneumatic pull valve control.

VI. EXPERIMENTAL SETUP

Copper die has two die where one is movable and another is fixed with the frame. Copper die movable one is fixed with pneumatic cylinder and it is controlled by an operating valve, it has input and output the input is connected to the air compressor and output is connected to the cylinder through one touch fitting valve and pneumatic pipes for the supply of air pressure. Cylinders are operated by using air compressor.

VII. WORKING PRINCIPLE

The two copper die is placed. One copper die is fixed; another copper die is fixed with a single acting cylinder which is movable. A single cylinder has only one entrance that allows the compressed air to flow through. Therefore it can be produced thrust in only one direction. The piston rod is propelled in the opposite direction by an internal spring. When the compressed air is passed through the tube. The

operating valve is connected to control the cylinder. Then the molten metal is filled in the copper die, after few seconds it will become solid state. The ejector is used to takeout the spectrocoin. The water sump is used to cooling the spectrocoin. The external force applied on the copper die, the coin fell down in the water sump. On that time cooling process is take place. After the coin is taken out. Then the grinding process is carried out for the smooth surface in the spectrocoin to get good result,then the coin is tested by analyzer by passing argon gas spark over the surface of the coin so, using spectrometer analyzer the results are produced. the test result contains various composition of metals in the coin.

VIII. ADVANTAGES AND APPLICATION

Advantages

- Easy to operate.
- Operation time is fast.
- No need of skilled labours.
- High accuracy.
- No damages to copper die. .

Application

- In casting industries.

IX. RESULT

The sample spectrocoin obtained by the new automated mechansim has no damages and smooth surface.The coin is directly tested in the spectrometer analyser without any grinding results displayed are with an higher accuracy of metal composition of an material.

X. CONCLUSION

The project has lot of potential in the future with the rise of need for advance technologies. From the project it has been identified that the damages for copper die is eliminated and prevent the damages and improves the properties of the spectrocoin.Therefore the overall efficiency is increased and reduces the human effort.

In future this project has more scope by newly designed pneumatic cylinder,compressor and operating valve at changing parameters.

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