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Sand Filter Machine

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Abstract— The Sand Filter Machine is a device designed to purify sand from rocks and stones, making it suitable for use in construction and other industries. The machine utilizes a series of filters and screens to separate sand particles from larger stones and rocks. It is an efficient and cost-effective solution for industries that require clean sand for their operations. The Sand Filter Machine project aims to address the growing demand for clean sand in various industries, including construction, landscaping, and agriculture.

Keywords— Filter 6mm, weighting sensor, electric motor, Battery

I. INTRODUCTION

A sand separator is a device that separates sand or other solids from water. One version of sand separator utilizes centrifugal force to separate sand or other heavy particles out of the water. The separated material drops down into a tank or reservoir where it can be removed later or in the case of in-well separators, the separated sand drops into the bottom of the well. It is not a true filter, since there is no physical barrier to separate out the particles, but it is often used upstream of a filter to first remove the bulk of the contaminant, where the filter does the final cleaning. This type of design reduces the time required to flush and clean the filter. Used in micro irrigation systems to remove sand and silt particles from irrigation water. Grinding circuits within the mineral processing industry and microirrigation. The coarse particles return to the mill for re-grinding while the finer products are passed on to a subsequent stage of treatment. Generally, while preparing the concrete for construction purpose, the process of sieving and mixing is carried out separately. These processes are carried out manually. Sand separator and filter is very efficient method for separating sand in different sizes. Small size sand is use for plaster, medium size sand column and large size sand use making floor in building. In construction site or industry separating sand is very time consuming. By saving this time and complete all construction within given time period we can use multistage sand separator and filter. By using our prototype model, we separate diff sizes of sand at a time and also in our model material handling is less compared to conventional method.

II. MOTIVATION

The motivation for developing a Sand Filter Machine to purify sand from rocks and stones for construction stems from the increasing demand for clean and high-quality sand in the construction industry. The construction industry is one of the largest consumers of sand worldwide, using it as a primary component in the production of concrete, asphalt, and other construction materials. However, the demand for sand has outstripped its supply, leading to over-exploitation of natural sand sources and a rise in illegal sand mining activities. Our main motive behind the sand filter machine is that to reduce extra labour cost of builders.

III. RELATED WORK

“STUDY OF DESIGN OF MULTILEVEL VIBRATION SCREENING MACHINE” By Salunkhe Prashant, Saurabh Naik, Sagar Sonawane, Vedanti Deore, Dinesh Bhadane²

Powder metallurgy is a new field with increasing popularity and productivity in the production of gears, sintered bushes and many other components. This is because of fact that this process needs a low production cost and has a faster rate of production and so also it is easy to maintain the stringent quality requirements. The component product by this method has good strength to weight ratio and are also effective in cost. Powder metallurgy involves the use of metal powder which is fixed with suitable binders like cobalt and wax. This mixture is then compacted in the dies on power presses to give the desired shape of the components. This component is later sintered in the sintering furnace to

give them necessary strength. The component product of large verity and hence required different grades of power. The components are basically designed for mechanical strength on the basis of the grit of powder i.e. the powder size. This powder size is always different for different application for which the component is to be put to use.

“Design & Fabrication of Multi-level Screening Machine” By D P Jadhav, Harishchandra Ekal, Karan Jambhale, Mahadev Garad¹

Different type of material in powder form or solid form is separated by using two-level screening machines. This machine can be used in different industries like mining, chemical, food & in metallurgical industries to separate component in different sizes. The work can be done by very few people. It requires very less time for completing work. This screening machine is made up of solid material like steel having high strength. It has two opening sides, from which different types of sand are obtained. In that screening machine two screens are placed to separate different size of components. The screens are made up of the wire mesh and come in various grid sizes.

IV. METHODOLOGY

Step 1: - We started the work of this project with literature survey. We gathered many research papers which are relevant to this topic. After going through these papers, we learnt about Sand Filter Machine.

Step 2: - After that the components which are required for our project are decided.

Step 3: - After deciding the components, the 3 D Model and drafting will be done with the help of CATIA software.

Step 4: - The components will be manufactured and then assembled together.

Step 5: - The testing will be carried out and then the result and conclusion will be drawn

V. EXPERIMENTAL SETUP



VI. MAIN COMPONENTS

ELECTRIC MOTOR:

An electric motor is an electrical machine that converts electrical energy into mechanical energy. Most electric motors operate through the interaction between the motor magnetic field and winding currents to generate force in the form of rotation. Electric motors can be powered by direct current (DC) sources, such as from batteries, motor vehicles or rectifiers, or by alternating current (AC) sources, such as a power grid, inverters or electrical generators. The largest electric motors are used for ship propulsion, pipeline compression and pumped-storage applications with ratings reaching 100 megawatts. Electric motors are found in industrial fans, blowers and pumps, machine tools, household appliances, power tools and disk drives. Small motors may be found in electric watches. In certain applications, such as in regenerative braking with traction motors, electric motors can be used in reverse as generators to recover energy that might otherwise be lost as heat and friction. Electric motors produce linear or rotary force (torque) and can be distinguished from devices such as magnetic solenoids and loudspeakers that convert electricity into motion but do not generate usable mechanical force, which are respectively referred to as actuators and transducers.

ULTRASONIC SENSOR : An ultrasonic sensor is a device that uses ultrasonic waves to measure the distance between the sensor and an object. It works by emitting high-frequency sound waves (usually in the range of 40kHz to 200kHz) and measuring the time it takes for the waves to bounce back after hitting an object.

Ultrasonic sensors are commonly used in various applications such as robotics, automation, and security systems. They are preferred over other distance-measuring sensors because they are non-contact, accurate, and have a long sensing range.

VII. CONCLUSION

The Sand Filter Machine project is a promising solution to the challenges faced by industries that require clean sand. The project seeks to provide a sustainable and cost-effective solution for obtaining clean sand from rocks and stones, while reducing the environmental impact of sand extraction. The machine utilizes a series of filters and screens to separate sand particles from larger stones and rocks, making it suitable for use in construction, landscaping, and agriculture industries.

By purifying sand from rocks and stones, the Sand Filter Machine reduces the dependence on natural sand sources and helps to address the negative environmental impacts of sand extraction. Additionally, the use of purified sand can enhance the quality of construction materials and improve the efficiency of construction processes.

In conclusion, the Sand Filter Machine project is an innovative solution that has the potential to significantly improve the sustainability of various industries. Its ability to provide clean and high-quality sand from rocks and stones can help to reduce the impact on the environment while meeting the growing demand for sand in the construction, landscaping, and agriculture industries.

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