

MULTIPURPOSE SOLAR SCREENING MACHINE WITH CONVEYOR

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ABSTRACT – This paper present the concept of multipurpose solar screening machine which are mainly used in the field of agriculture and in the field of construction, required SAND as an important ingredient sand is used at different stages in construction right from the foundation to the finishing work that is plaster. Today in this world every task have being made quicker and fast due to advance technology, food grains, sand and any mixture usually comes in different size, since some product require different size of sand or mixture that's why this machine is design to sieve to the food grains, sand or sub sand in to different size of things, due to changing by the strainer depend on the requirement of need. It require to very less time in completing to the work, this machine easily operated by the low skilled labor. Commonly the work of screening is done by manually using fixed strainers, due the fixed strainers the work perform by the higher requirement of time and the worker become tired by doing the work, to make this work in easy way we have design to this machine. This machine is work automatically, it lift to the raw material from bottom by the conveyor belt and sieve in easy way.

INTRODUCTION-

Steel is a key ingredient in all the industrial and construction purpose. Due to development of industries 4.0. It is necessary to adopting new technologies for the development of Nation. In today's scenario everyone wants to be done to the work in easy way and quickly. In the large work of the construction the more need of the labor and the labor do the hard work, and this work output is not to be satisfied. Similarly in the field of the agriculture the large amount of the food grains have need to sieve and the unwanted particle need to be remove from them, for doing this type of work need to the more requirement of the worker and also to the time and hard work. The machine is operated by only one person and the work done fastly in comparison to the man, and give to the more output in less time. The machine can lift to the material automatically from the bottom by the help of conveyor, and from the conveyor the material left in the strainer after that the strainer sieve to the material and remove to the un-wanted material, and the material become free. The different-different size material can sieve by the

changing to strainer and work can be performing in easy way. This machine can be operated by the automatically, hand operated, and by the paddle operated also.

Key Words: Conveyer Belt, Gear Motors, Solar Panel, Strainer, Free Wheels, Handle, shaft, crank.

OBJECTIVE-

- ✚ **Primary goals:** Design and build a rotator sand sieving machine that separates sand from a mixture.
- ✚ To replace the time-consuming old technique of doing things by hand paddle and by the motor.
- ✚ We save to the time, and work can perform in large quantity.
- ✚ We can use of this machine in the field of the agriculture, in the field of the construction and in the field of the mining to sieve to the material.
- ✚ There is no required to the skilled labor, and the work can perform only one labor.
- ✚ When the machine is operated by the automatically then the no requirement of any worker.

Supporting Objectives:

- ✚ To gain a better understanding of the sliding crank mechanism.
- ✚ Develop interpersonal skills as well as knowledge of the instruments and processes used in a mechanical workshop.
- ✚ To learn how to plan ahead of time and stick to a budget.

C. Importance:

- ✚ Fabrication, mining & agriculture work is carried out depending on the specified design for the works and the system that use this mechanical item.

- + This multi-purpose sieving machine can separate a product of different sizes by altering strainer size.
- + Only certain particle sizes are allowed.

LITERATURE REVIEW-

From for years, the human community has been the most essential thing. The majority of sediments, including sand, are made up of rock pieces that have been worn by the elements such as wind. They start off as larger fragments that break down when rivers take them downstream; the finer the particles, the better. The further a particle has traveled, the more it has traveled. To put it another way, big bits of gravel can be found towards the head of a well. river. Gravel becomes finer as it flows downstream, becoming cobble, pebble, granule, and finally sand. The sediments are deposited in the ocean once the water flows into it. In the ocean sub duct, sediments developed. Trenches with sub ducting tectonic plates to the Earth's interior. Pieces do come loose from time to time. Continental plate on the wall as simulating into a new continent the geological structures that result from this process are known as accretionary organisms. Subduction zones, such as Japan, have a lot of accretionary bodies. A significant portion of the Japanese islands Sand is an essential component of all building projects, and it is used in the majority of them. There are several ideas being researched to remove the sand from mixtures. This method sieves the sand into different sizes depending on the size of the net used. Normally, this sand is smooth. In structures or houses, the main building material is or product. To achieve higher-quality items, make sure the process is as fluid as possible. Sand is required for a variety of products, including food grains.

COMPONENTS USED

+ Solar panel

Solar panel is device which is absorbing solar energy and convert in to the electrical energy. This electrical energy is use in the battery charging. The solar energy is provided by the nature, is free of cost. This solar energy is used in that field where the availability of the electric light have not sufficiently available or when, during the performing work the electric light break down, then the importance of solar energy is useful.



Figure.1

+ Battery

Battery is a device which store electrical energy, it stores the 12 volt DC current and used in power transmission. The battery is connected to the motor by a switch which is helps in rotate to the motor. Battery is charged by the help of solar energy or the electrical energy.



Figure.2

+ Shaft

Shaft is a rotating machine element, which is used to transmit power from one part to another part. Shaft is menially in circular shape. Here shaft is rotated by the help of the motor, and pulley also rotate. The shaft is fitted by the two circular bearing.



Figure.3



Figure.5

Pulley

A pulley is a wheel is fitted on the shaft with permanent joint, it rotate due to the rotating to the shaft. It designed for movement, and transfer to the power from the shaft to the load, by the connecting rod.



Figure.4

Strainer

The strainer use in the sieve to materials like – wheat paddy, pulses cereals and construction materials. Therefore it is essential that the sieving cover various ranges of mesh sizes, by the changing of the strainer. Due to the changing the strainer we can sieve the different-different size of the material in that size of the strainer. Sieve the material in large quantity in very small time.

Wheel

A Wheel is a circular component that is intended to rotate on an axle bearing. Heavy objects to be moved easily facilitating to movement or transportation while supporting a load or performing labor in machines. A Wheel greatly reduces friction by rolling together with the use of axles. The wheel can easily rotate in 360° by which we can transport to the machine from one place to another place.



Figure.6

Conveyor System

A Conveyor System is a common piece of mechanical handling equipment that moves material from one location to another location conveyors are specially useful in application involving the transport of material. In this machine the use of the conveyor is, lift the material from the bottom and left in the strainer.

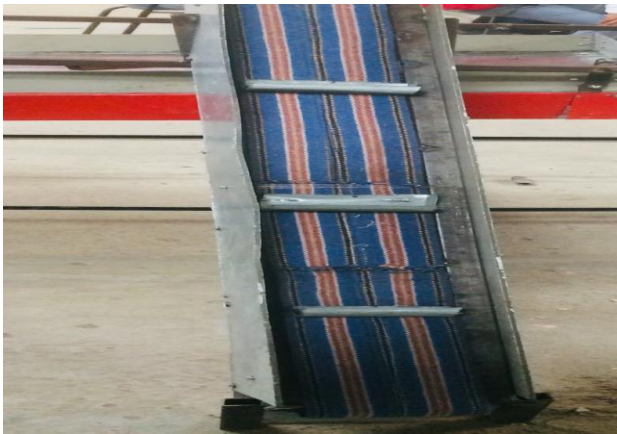


Figure.7

Motor

Motor is a machine which is operated by the electrical current. Here we have use the gear motor which is provided to the high torque. The motor is operated by the 12 volt DC current with the help of the battery .due to the high torque the motor rotate to the shaft by a chain and shaft is rotated to the pulley and from the pulley is connected the strainer by the connecting rod, and make a proper chain, is operated easily.

A coil of wire with a current running through it generates an electromagnetic field aligned with the center of the coil. The direction and magnitude of the magnetic field produced by the coil can be changed with the direction and magnitude of the current flowing through it. A simple DC motor has a stationary set of magnets in the stator and an armature with one or more windings of insulated wire wrapped around a soft iron core that concentrates the magnetic field. The windings usually have multiple turns around the core, and in large motors there can be several parallel current paths. The ends of the wire winding are connected to a commutator. The commutator allows each armature coil to be energized in turn and connects the rotating coils with the external power supply through brushes.



Figure.8

Free wheels

Free wheels is machine element which is used in the power transformation from one shaft to the other shaft, here the power transmitted from paddle to the shaft with the help of the chain.



Figure.9

STRUCTURE ANALYSIS

Frame-

Length- 128.5 cm

Width- 81.5 cm

Height- 98 cm

Solar Panel frame-

Length- 40 cm

Width- 33 cm

Height- 25.5 cm

Strainer-

Length- 76 cm

Width- 67 cm

Height- 13 cm

Shaft-

Length- 58.5 cm

Diameter- 10 cm

Pulley-

Diameter- 7.5 cm

Thickness- 0.5 cm

Bearing-

Diameter- 22 cm

Thickness- 1.5 cm

Free wheel-

Diameter- 24 cm

Paddle sprocket wheel - 51 cm

Chain-

Length- 74 cm

Shaft Gear- 27 cm

Motor Gear- 25 cm

Gear motor-

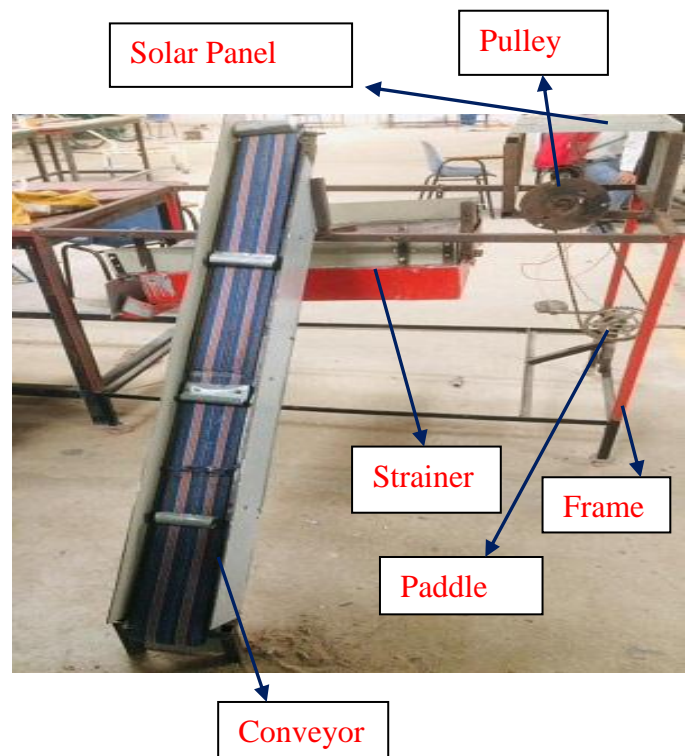
1. Motor :- 200-500 rpm
2. Motor: -200-300 rpm

WORKING PRINCIPLE

This machine is designed with the help of many parts like-Steel rod, Wheels, bearing, pulley, chain, chain spacers, paddle, shaft, crank, gear motor, conveyor belt. The machine is working on the basis of the crank and slider mechanism. This machine is operated by the hand mode, paddle mode, and with the help of the motor. In this machine the use of the solar panel, which absorbed solar energy and convert in the electrical energy, to charge the battery. When we start to the motor, then the shaft start rotating in 360 degree with the help of chain and spacers, are connected to the shaft and motor. Shaft is fitted on the bearing; produced freely motion and shaft rotate easily. The pulley connected to the shaft in permanent joint. One end of crank is connected to the pulley and other is connected to the strainer. The strainer reciprocates in only one direction, work process is similarly when the machine is operated by the manually or by the paddle.

✚ Conveyor is operated by the motor, and working on the double crank mechanism. Conveyor automatically lift to the material from the bottom with the help of cups which are fitted in belt, the cups left the material in the strainer, after that the strainer sieve to the material and remove the un-advantage particles from them.

✚ By this process we can easily sieve the different-different size of materials by the changing of that size strainer in easy way in very short period of time. By this process we can sieve the large quantity of materials in some time, and very less requirement of the workers.



Final Project Image

COMPONENT USED

S. No.	COMPONENT NAME	QUANTITY	PRICE
1	Gear Motor	2	550
2	360 Wheel	4	400
3	Chain	2	110
4	Free wheels		220
5	Pulley	1	150
6	Bearing	2	250
7	L Type Pipe	10 fit	190
8	Square Pipe		1270
9	Shaft	1	150
10	Strainer	1	150
11	Thin Metal Sheet	60 sqr fit	500
12	Nut Bolt		300
13	Secure	200	100
14	Conveyor Belt	1	450
15	Conveyor Hub	2	250
16	Handle	1	100
17	Solar Panel	1	800
18	Switch	2	50
19	Battery	1	800
20	Cycle Hub	2	125
21	Other cost	--	650
	Total		7565 INR



Group Image

BIOLOGRAPHY



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CONCLUSION

- ✚ It should be minimized the labour cost and perform effectively.
- ✚ Doing optimized work with minimum possible time period.
- ✚ It's basically three way processes such as automatic, manually and paddle operated.

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her M. Tech from Centre for advanced Studies, AKTU, and Luck now in 2021 in the field of Manufacturing Technology & Automation. In the Materials Science & Engineering Department her thesis deals with the problem of metallic corrosion & Materials Degradation. She published her research work in various SCI/SCIE journals.



Mr. Chetan Kumar Pal, Currently working as a Workshop instructor at Rameshwaram Institute of Technology & Management. He has 20 years experienced in the field. He has managed the whole workshop and perform various processes like Welding, Metal Cutting, Forming, Forging etc.