Vibrator Machine for Petal Filteration

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Abstract— This is report on petals filteration machine which is used to separate out the unwanted particles such as stone, dust, dirt and other particles from the petals of flower using the vibration motion of machine. This is a universal machine too separate out the unwanted particles of different types of petals of the flowers. So we design and develop the vibrator machine. In this case when the petals fall on the strainer, from the hopper, due to vibration motion of strainer the petals are split as well as it flow in downward direction at the time of petals flow in downward direction the stones , sand and other dust particles which are present in the petals it separates out and collect in the tray. Remaining clean petals are moves forward for next processing.

Keywords: Petals, Strainers, Vibration, Stone, Hopper, Flower

I. INTRODUCTION

Self-Cleaning Screen Media Was Initially Engineered To Resolve Screen Cloth Blinding, Clogging And Pegging Problems. The Idea Was To Place Crimped Wires Side-By-Side On A Flat Surface, Creating Openings And Then, In Some Way, Holding Them Together Over The Support Bars. This Would Allow The Wires To Be Free To Vibrate Between The Support Bars, Preventing Blinding, Clogging And Pegging Of The Cloth. Initially, Crimped Longitudinal Wires On Self-Cleaning Cloth Were Held Together Over Support Bars With Woven Wire. In The 50s, Some Manufacturers Started To Cover The Woven Cross Wires With Caulking Or Rubber To Prevent Premature Wear Of The Crimps. During The Mid 90s, Major Wire Industries Ltd., A Quebec Manufacturer, Developed A "Hybrid" Self-Cleaning Screen Cloth Called Flex-Mat, Without Woven Cross Wires. In This Product, The Crimped Longitudinal Wires Are Held In Place By Polyurethane Strips. Instead Of Locking The Vibration Over The Support Bars With Woven Cross Wires, The Polyurethane Strips Lessens The Vibration Of The Longitudinal Wires Over The Support Bars But Does Not Stop It, Consequently Allowing Vibration From Hook To Hook. Major Wire Quickly Started To Promote This Product As A High-Performance Screen That Helped Producers Screen More In-Specification Material For Less Cost And Not A Problem Solver. They Claimed That The Independent Vibrating Wires Helped Produce More Products Compared To A Woven Wire Cloth With The Same Opening And Wire Diameter. This Higher Throughput Would Be A Direct Result Of The Higher Vibration Frequency Of Each Independent Wire Of The Screen Cloth Compared To The Shaker Vibration Accelerating The Stratification Of The Material Bed. Another Benefit That Helped The Throughput Increase Is That Hybrid Self-Cleaning Screen Media Offered A Better Open Area Percentage Than Woven Wire Screen Media. Due To Its Flat Surface, Hybrid Self-Cleaning Screen Media Can Use A Smaller Wire Diameter For The Same Aperture Than Woven Wire And Still Lasts As Long, Resulting In A Greater Opening Percentage. [1]

The Vibration Separator machine. It is Also Called Screening, is The Process of Taking Granulated ore Material And Separating. It into Multiple Grades by Particle Size This Process Occurs In A Variety Of Industries Such As Mining And Mineral Processing Agriculture, Food, Plastics, And Recycling. The Inclined Horizontal Sieving Machine Is A Machine Designed To Separate The Particle According To Their Mesh Size At Different Levels. In Much Industry For Example Mining Processing, Agriculture, Food Plastics It Is Often Desirable To Comminute Particular Matter I.E. To Reduce He Particular Size of Given Material. Saving is A Simple Technique for Separating the Particles of Different Size. Small Sieve Such As Used For Sifting Flour Has Very Small Holes The Depending Upon The Types Of Particles To Be Separated Sieves With Different Types Of Holes Are Used On Same Vibratory Machine .Sieves Are Used To Seprat The Stone From Sand And Also Used To Separate The Stone From Petals Of Different Flowers.

In Our Report We Can Make The Separator Machine For Separate The Dust , Dirt Particles And Unwanted Particles From The Petals Of Flowers .In This Case The Dry Petals Of The Flowers Are Come From The Hopper Then It Will Fall On The Strainer Which Is Vibrated By The vibrator .Due To That Vibratory Motion And Slope The Petals Are Vibrates And Moves Forwards .And Due To Smaller Holes On The Strainer ,Small Unwanted Particles Are Falls Down The Bottom Of Strainer .So Remaining Clean Petals Moves Forward For Further Process . The most important characteristic feature of membrane screens is the excitation of sieve vibrations by the so-called pushing rods (Szymański, Wodziński 2001). This causes a non-uniform amplitude distribution on the sieve surface. It is known that the sieve vibrations are a driving force of feed motion, i.e. screened material motion, and one of the most significant parameters on which the success of screening depends. The screening is successful if the finer fraction is screened off at the highest efficiency possible. We mean here the so-called recover or efficiency of the undersize fraction, i.e. the ratio of the mass of undersize particles screened off to the mass of particles of the finer fraction present in the feed.[2]

II. WORKING PRINCIPLE

Basically We Design The Vibrator Machine, Petals Is Used In Manufacturing the Incense. The Petals Needs To Be Filtered And Separated From Unneeded Particles, Stones, Sands And Other Smaller Particles Before It Is Put To Use.

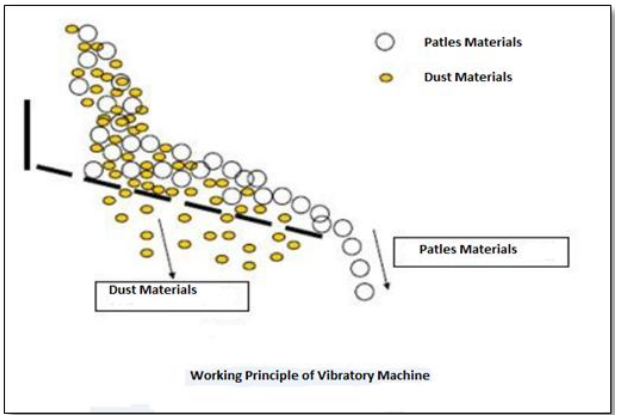


Fig. 1: Working Principal of Vibratory machine

We Can Separate Out The Stone Or Unwanted Particles From The Petals. This Vibrator Machine Consist Of Motor, Rotor, Strainer, Etc. So Basically Strainer Is Mounted On The Rotating Shaft Which Are Fitted To The Motor, So As Motor Start, Strainer Start To Vibrates In Longitudinal Direction .When The Petals Fall On The Strainer, From The Hopper, Due To Vibration Motion Of Strainer The Petals Are Split As Well As It Flow In Downward Direction At The Time Of Petals Flow In Downward Direction The Stones , Sand And Other Dust Particles Which Are Present In The Petals It Separates Out And Collect In The Tray .Remaining Clean Petals Are Moves Forward For Next Processing.[5]

III. DESIGN ANALYSIS

A. Mechanism Selection

Mechanism for vibration is cranks and rocker mechanism-
r= Crank radius- 30mm
l= Tray lenghth-1000mm
According to displacement of link and space consideration
Crank displacement = link displacement
$r \times \theta = l \times \emptyset$
$30 \times 180^0 = l \times 45^0$
l = 120mm

B. Power Calculations

F= m × a
Where, F=force N
m=total mass of tray and petals kg
a=acceleration of tray m/s^2
=25×4.3
=107.5
T= F× r
Where, T=torque N-M
$=107.5 \times 3 \times 10^{-2}$
=3.225 N-M

$$P = \frac{(2 \times \pi \times N \times T)}{(60)}$$

Where, P=power watt
N=revolution per minute

$$P = \frac{(2 \times 3.14 \times 1440 \times 3.225)}{(60)}$$

$=486.31$ watt

C. Design of Crank Shaft

$$\tau = \frac{16T_e}{\pi d^3}$$

$d = 21.58mm \cong 22mm$
So Diameter of Crank Shaft is 22mm
Where,
τ = Shear Stress N/mm^2
T_e = Eqivalent Torque Nmm
d = Diameter of Crank shaft mm

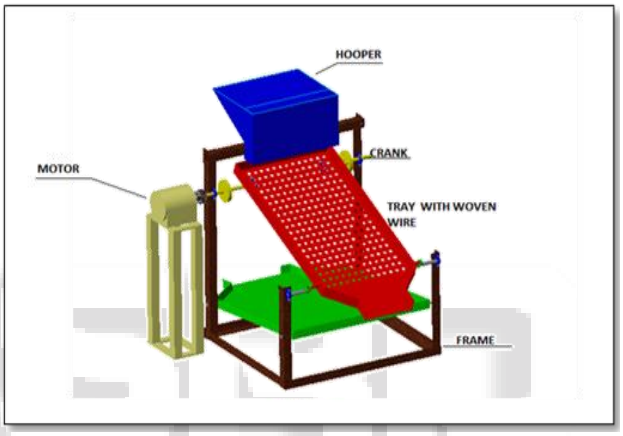
D. Selection of Bearing

$$L_{10} = \left(\frac{C}{P_e}\right)^n$$

L_{10} = Life of Bearing In Million Revolution
Where,
P_e= Equivalent load KN
C= Dynamic load carrying capacity of bearing KN
C = Dynamic Load Carring Capacity of bearing

$$2592 = \left(\frac{c}{352.6936}\right)^3$$

C = 4.84kN



IV. RESULTS AND DISCUSSION

A. Performance

The vibrator machine for petal filtration is used for filtration of rose petals in that machine the crank and rocker mechanism is used which gives the motion to petal in different way when it is travel on the tray that is rotary motion at start elliptical at middle and linear at end which improve the filtration efficiency and filtration capacity become 40 kg /hr.

V. CONCLUSION

The vibrator machine for petal filtration is design and developed for the filtration of the rose flower which improve the efficiency of filtration and increase the filtration capacity also up to 40 kg/hr.

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