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Guide By: Prof. M.D.Patel

TITLE

"DESIGN AND DEVELOPMENT OF SEMI AUTOMATIC AGRICULTURAL PRODUCT FOR THE SHORTING OUT POTATOES ACCORDING TO SIZE"

CONTENTS

➢ Introduction

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➢ Function & calculation of pulley and belt system

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➢ Working system of machine

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INTRODUCTION

➢ Shorting out the potatoes according to the size with the help of machine to minimize human effort.

➢ Now a days, farmers have been working on manually basis to be hire the workers and use tolerance templates measuring instrument to measure potatoes size.

> **Fig 01:** Present method for sorting potatoes.   [1]

Problems found in current situations

➤High Labour Cost.

➤To consume more time.

➤Farmers have not get more economical benefits, due to unsorting of potatoes.

Literature review

➢ **Sr**.   **Title**   **Investigator**

1.   Design, development   Abdollah Golmohammadi,

& evaluation of an   Farid Bejaei,

online potato sorting   Hossein Behfar

system using machine

vision.

➢ **Remarks:**

• In this research paper evaluated that to be research for quality of the potatoes and after sorting based on size in manual form. [1]

➢ **Sr.** **Title** **Investigator**

2.   Potatoes grading and   John M. Gunn

       sizing machine.

➢ **Remarks**:

• Evaluated this pattern manual basis system to revolve the cylinder and small size of potatoes not in exact size is to be sorted out. [2]

➢ **<u>Sr.</u>   <u>Title</u>   <u>Investigator</u>**

3.   Potato size grading   Cornelius Barret Speaks,

         machine.   et. all
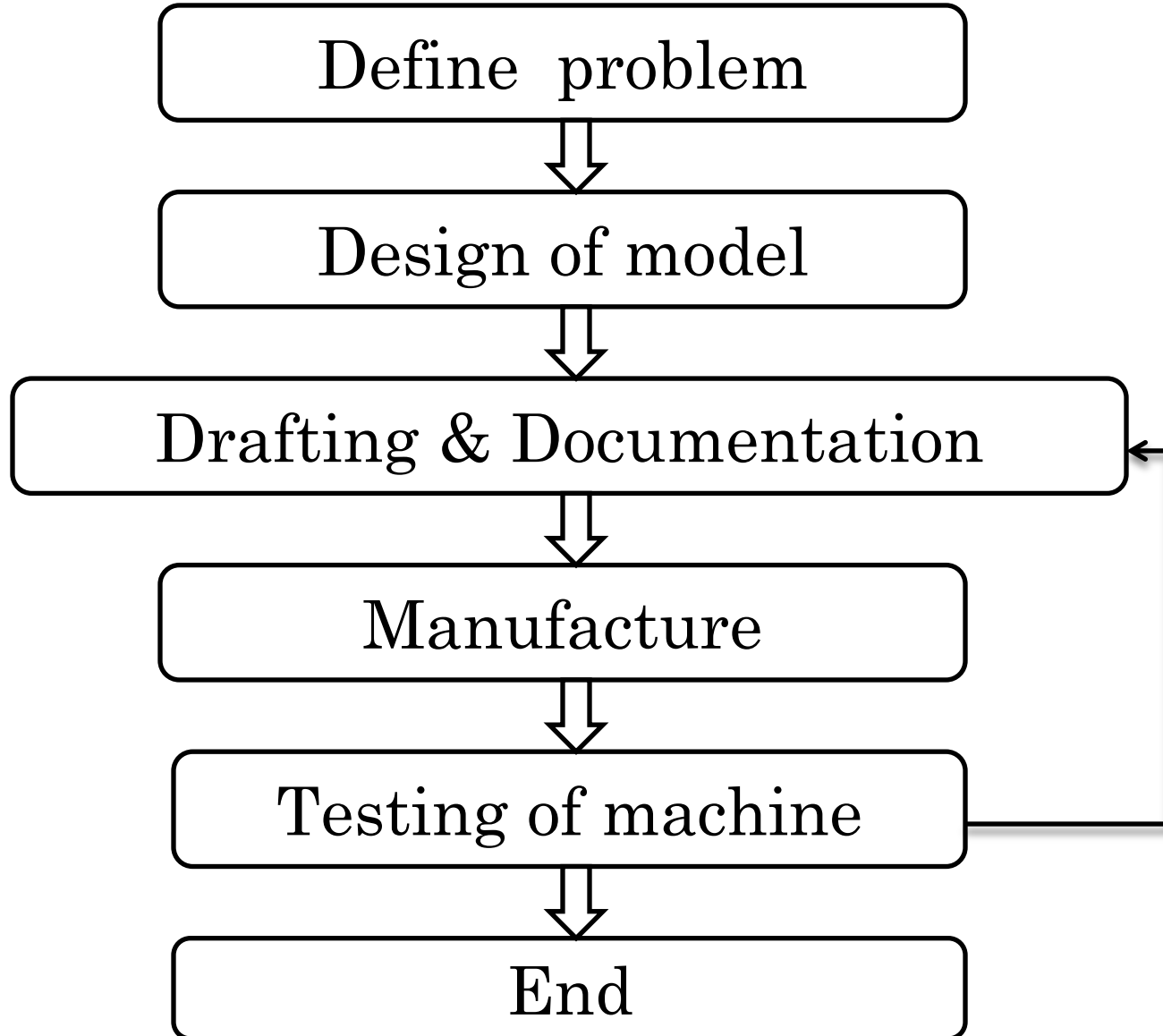

➢ **<u>Remarks:</u>**

• In this pattern to be remarked that manual basis cross bar mechanism, this mechanism is simple and do not get higher efficiency.   [3]

➢ **Sr.**   **Title**   **Investigator**

4.   Potato sorting   Elisha F. Purdy,

          machine.

➢ **Remarks:**

• Evaluation of this pattern to be removed that use chain mechanism process is very low efficiency to be feeding and low process of sorting. [4]

Methodology

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┌─────────────────────────────┐
│       Define  problem       │
└─────────────────────────────┘
              ↓
┌─────────────────────────────┐
│       Design of model       │
└─────────────────────────────┘
              ↓
┌─────────────────────────────┐
│   Drafting & Documentation  │←─┐
└─────────────────────────────┘  │
              ↓                   │
┌─────────────────────────────┐  │
│         Manufacture         │  │
└─────────────────────────────┘  │
              ↓                   │
┌─────────────────────────────┐  │
│      Testing of machine     │──┘
└─────────────────────────────┘
              ↓
┌─────────────────────────────┐
│             End             │
└─────────────────────────────┘
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Main Parts of machine

1) Induction motor
2) Belt and pulley system
3) Face plate with eccentric pin
4) Connecting rod
5) Wooden frame
6) Sieves
7) Hopper
8) Supporting members

Selection of material for machine

➢ For machine structure, We are using wooden material.

➢ We are using belt and pulley system for mechanism.

➢ Sieve plates with different gauges are manufacture from S.S. material.

➢ We are uses connecting rod, which is made from M.S. material.

➢ We uses 2.5,3, 9 and 12 inches pulleys, which is made from C.I material.

➢ For supporting the machine, we made frame structure from L-section channel, which is made from M.S. material.

Specification of motor

- Type of motor: Induction motor

- Phase: Single phase A.C. motor

- Speed: 1500 r.p.m.

- Voltage: 12 kw

- Horse power: 0.5hp

Function of belt and pulley system

➤ Basically our motor speed is 1500 r.p.m. so, it is required to decrease the speed of the motor inform of 105 r.p.m. by belt and pulley system.

• Calculation:-

➤ For counter pulley 1:

$$\frac{\text{Speed of motor}}{\text{r.p.m. of 9 inch pulley}} = \frac{\text{Dia. of counter pulley}}{\text{Dia. of motor pulley}}$$

$$\frac{1500}{N9} = \frac{9}{3}$$

N9= 500 r.p.m

- For counter pulley 2:

$$\frac{\text{r.p.m. of 2.5 in. pulley}}{\text{output r.p.m. of 12 in. pulley}} = \frac{\text{Dia. of output pulley}}{\text{Dia. of input pulley}}$$

$$\frac{500}{N12} = \frac{12}{2.5}$$

N12= 105 r.p.m

2.5 inch

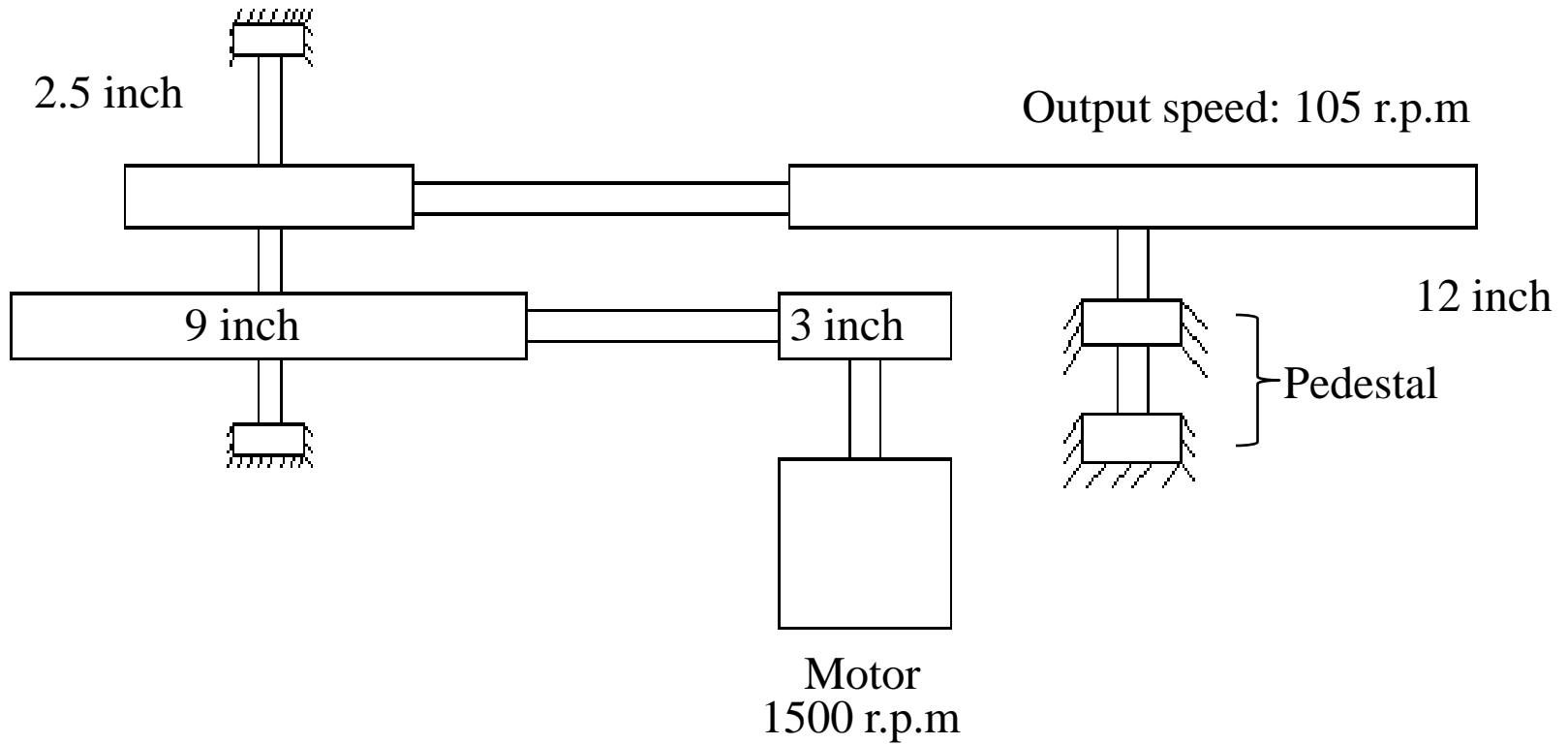Output speed: 105 r.p.m

9 inch

3 inch

12 inch

Pedestal

Motor
1500 r.p.m

Fig: Mechanism of V-belt and pulley system

SKETCH OF MODEL
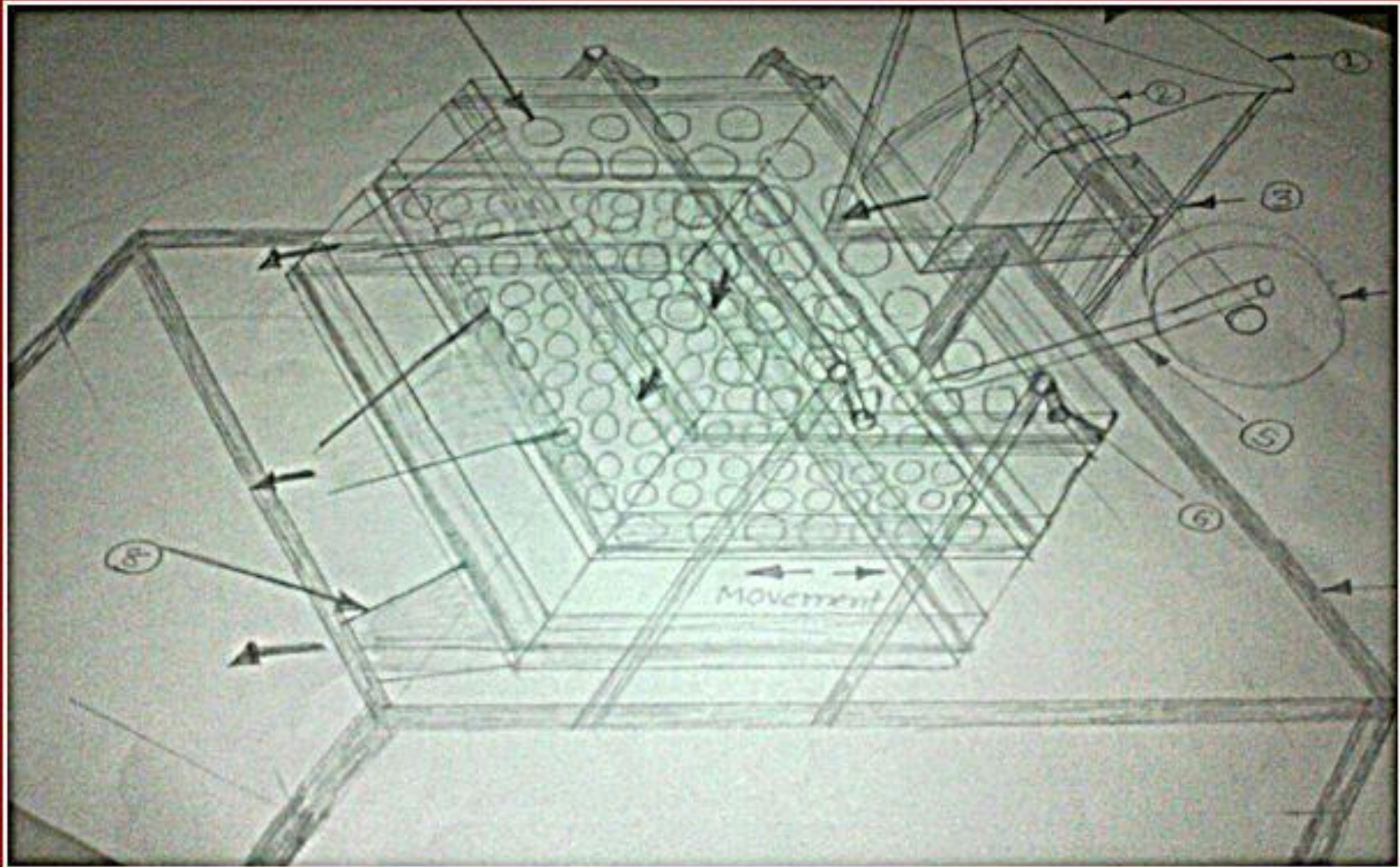
Fig 02: Hand sketch of our model
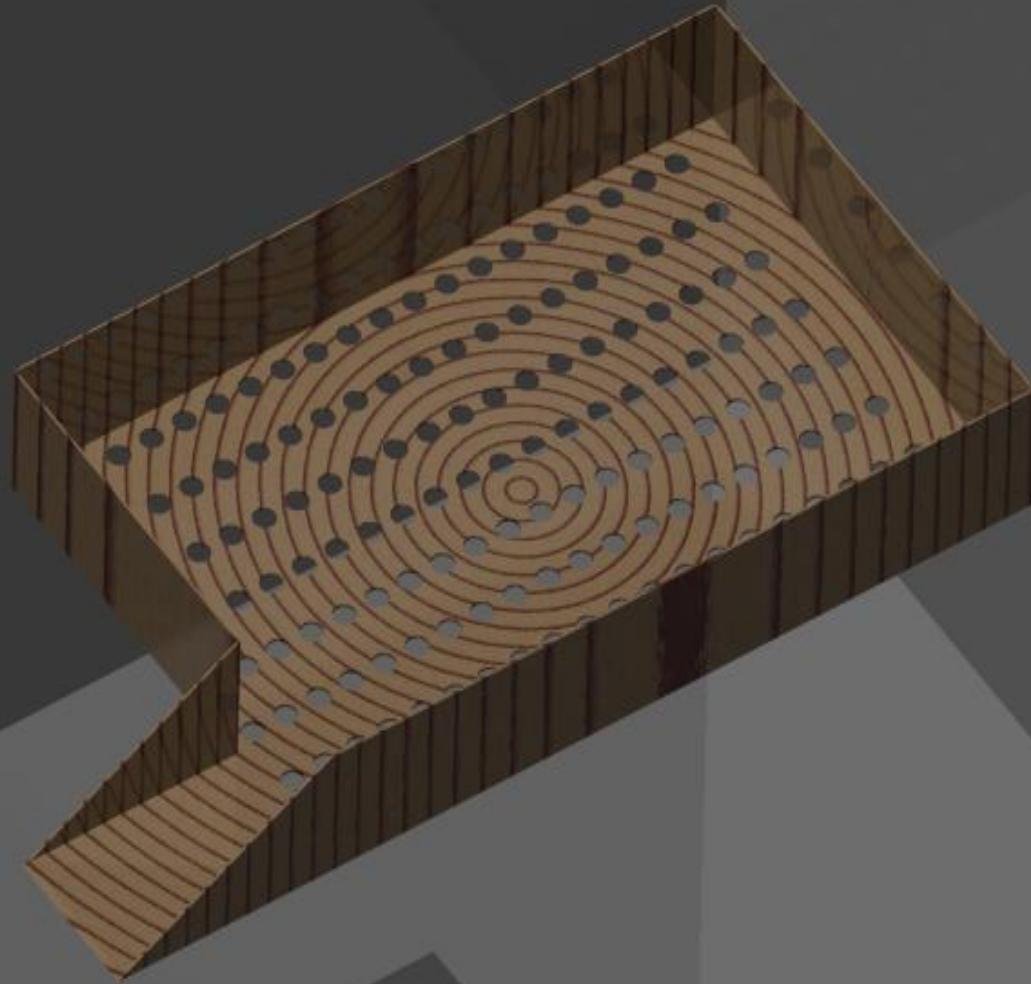
Fig 03: 45 mm dia. hole of sieve
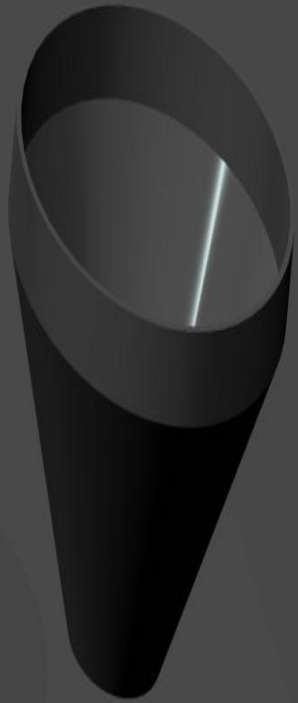
Fig 04:   Hopper   Wastage Collector Sieve
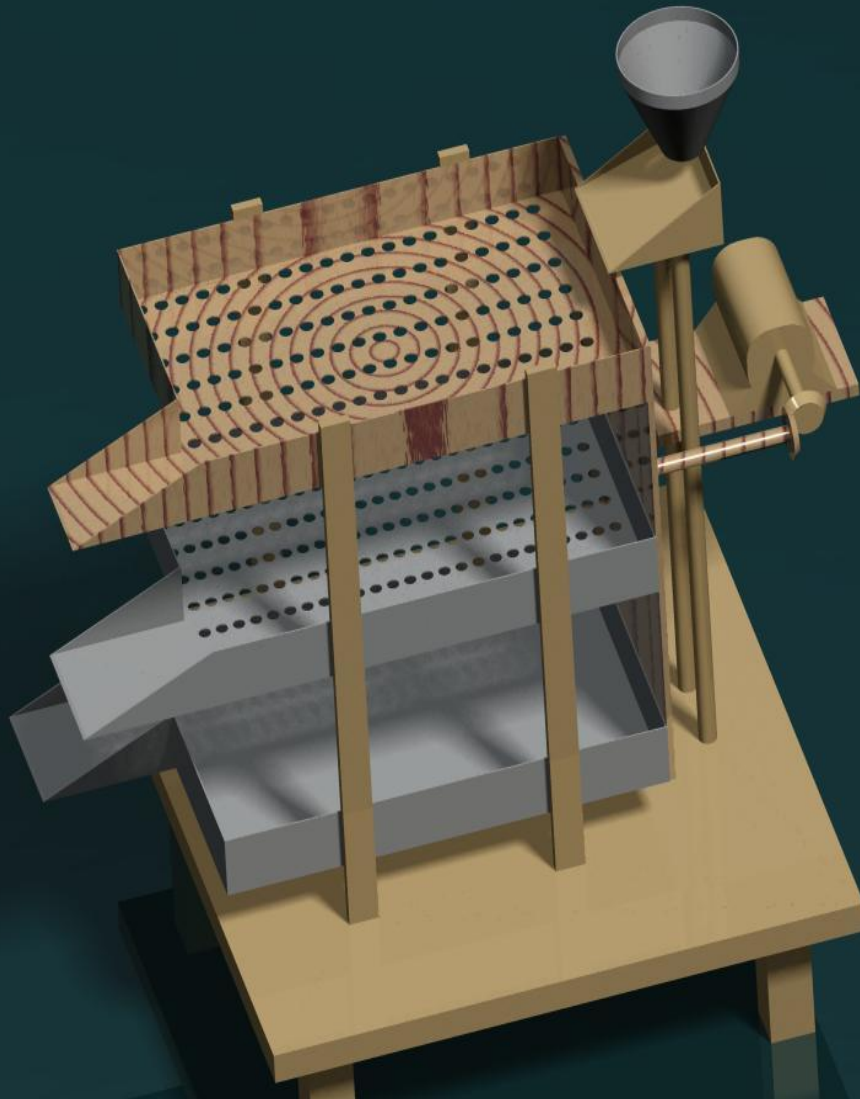
Working system of machine

Fig 05: 3D Model in Creo Parametric 2.0

Conclusion

- Completion of model we are conclude that farmers will be operating the machines easily and no extra knowledge required.

- As compared to the present scenario to be used the automatic sorting machine so less effort required for farmers.

- Big sizes of potatoes sorting out top sieves and after small sizes of potatoes sorting out wastage collector in solid sieves.

WORK TABLE

	Aug	Sep	Oct	Nov	Dec	Jan	Feb	March	April
Define of problem	🟥								
Design of model		🟦	🟦	🟦	🟦				
Design & Documentation		🟨	🟨	🟨	🟨	🟨			
Manufacture						🟪	🟪	🟪	
Testing of machine									⬛

REFERENCE

➢ **<u>Books:</u>**

1. O.P.KHANNA, Dhanpat rai Pub. "Industrial Eng. & Management" , page no. (1-5)

2.Scrop kalpakjian and steven r. Schmid, person edu, "manufacturing eng.and techology",Spage no.30

➢ **<u>Website:</u>**

1.
Sciencedirect&oq=sci&aqs=chrome.2.69i57j69i60j69i59l3.5763j0j7& sourceid=chrome&es_sm=93&ie=UTF-8.

2.
Sciencedirect&oq=sci&aqs=chrome.2.69i57j69i60j69i59l3.5763j0j7& sourceid=chrome&es_sm=93&ie=UTF-8#q=us+pattern

➢ **<u>Figure:</u>**

1. Meghdoot Coldstorage, Palanpur

➤ **<u>Paper/thesis:</u>**

1. Abdollah Golmohammadi , Farid Bejaei , &
   Hossein Behfar, 2013, "Design , development &
   evaluation of an online potato sorting system
   using machine vision" at Iran, IJACS/2013/6-7/396-402

2. Cornelius Barrett Speaks, Kansas in Oct 1899, "Potato size
   grading machine"

3. Elisha F. Purdy, Paul J. Speicher, Indiana "Potato sorting
   machine"

4. John M. Gunn, Minnesota, Newyork in Dec 1915, "potato
   sorting machine"

Thank you