



# Development of Wheat Cleaning Machine

Prof. R. M. Choudhari

<sup>1</sup>*Asst. Professor, Padmashree Dr.V.B.Kolte College Of Engineering, Malkapur*

**DOI: 10.5281/zenodo.7162688**

## ABSTRACT

*In today's world, productivity and quality of food grains not only depend on the fertility of soil, or the keeping of crops but also on the processing of food grain after reaping because during processing a large amount of available and useful grains are lost. This machine are modified by to the some parts, in that machine the hopper is used enter and to collect the grain, but I will modified and to provided by magnetic drum with help to removing of stone particle of that grain. and also to be used by both side of the blower and upper side of blower to mounted on vibrating deck , in that purpose the grain particle are totally cleaned with the help of air or magnetic drum and also to improve productivity, quality of grain.*

## 1. INTRODUCTION

Agro processing is defined as set of techno-economic activities, applied to all the produces originating from agricultural farm, livestock, agricultural sources and forests for their conservation, handling and value-addition to make them usable as food, feed, fiber, fuel or industrial raw materials..

In this machine we are trying to design and fabricate an equipment which can reduce amount of wastage during separation of nee skin from paddy. Our equipment i.e wheat cleaner is used to remove skin or separate husk. A method of hopping paddy which comprises revolving numerous hopping ganes having outer bent ends to produce a lower atmospheric pressure zone which is virtually the same as the vacuum state, passing paddy through the said lower pressure zone to expand the gas in paddy abruptly thereby rendering paddy to the state just be to be the crack and immediately thereafter throwing paddy against outer bent ends of the hopping vanes to crack the hopper and then discharging the cracked paddy into the air pressure zone so that hoppers and husked wheat are separated perfectly and remove impurities ,stone and wastage material.

## 2. METHODOLOGY

In the wheat cleaner machine the wheat can be cleaned by using two methods based on two different principles . Based on this principle the machines can be classified in two types namely:-

- Gravity separator by using Vibrating mesh & vacuum pressure,
- And by using magnetic principle.

Spectrum De-stoners" or grain separators are highly functional destoner machinery and have found several applications such as separating heavier materials like stones, glass, metal etc. from food grains and other dry granular.

The principle that lies behind its functioning is the stratification of the product into heavier and lighter fractions by introducing air through the bed of material. This is possible if there is a means of pressure fans located in the body of the machine, below the vibrating deck. The vibrating deck pushes the heavier material which is in contact with the deck upwards towards the stone discharge spout. The lighter material flows down the inclined, vibrating deck and exits through the clean product spout.

It is possible to individually adjust the inclination of the vibrating deck, speed of eccentric motion, feed rate and the air flow in order to achieve the optimum degree of separation. We have a wide variety of deck screens available with us to suit specific applications. All adjustments are easy and require minimum operator training.

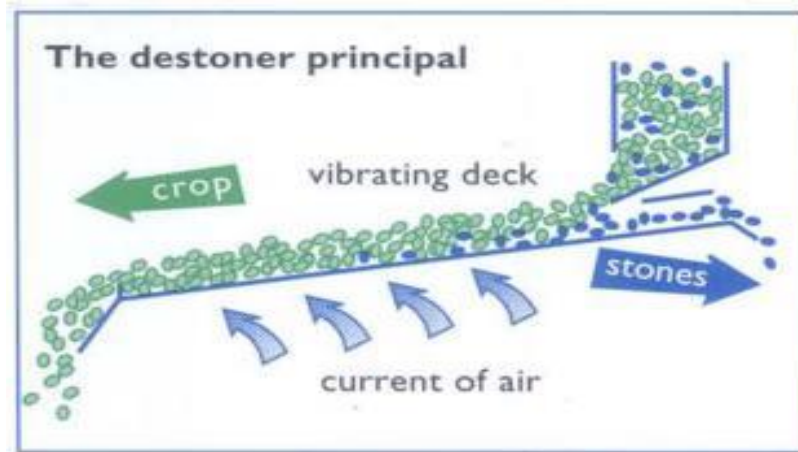
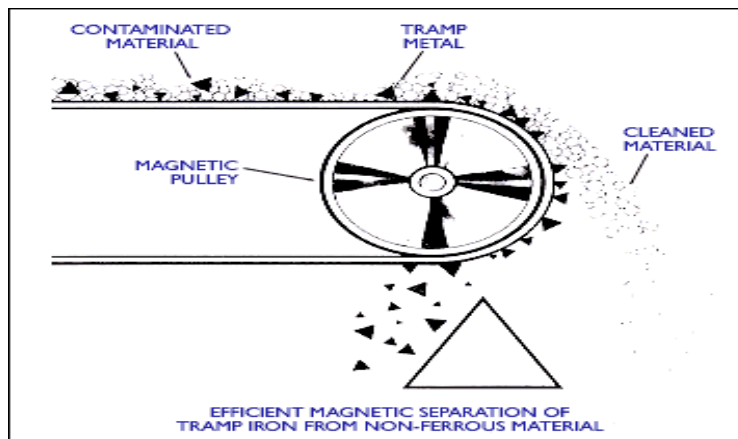


FIG 1- Mechanism of vibrating mesh & vacuume pressure

### 3. MAGNETIC PRINCIPLE USED IN WHEAT DESTONER



In magnetic principle of this wheat cleaner machine magnet plays an important role to remove stone from the wheat. As we know the property of magnet is to attract the iron particle toward it, as the wheat contains stones containing impurities like stone in it which has an magnetic property which attracted by magnet and stick to its surface.

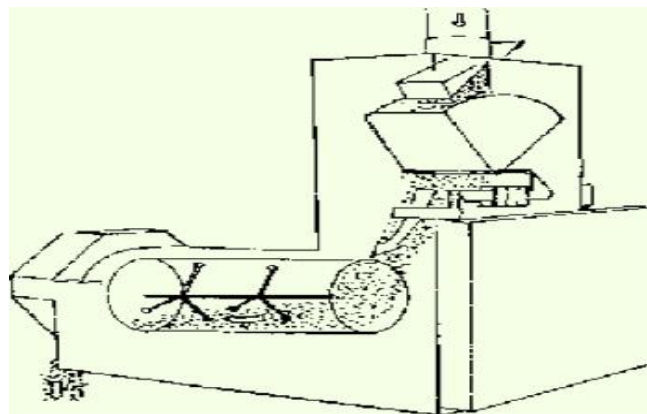


Fig 2 – magnetic principle used in wheat cleaner machine



In this Wheat cleaner machine, the grains containing impurities is poured in to hopper comes down on magnetic drum and the magnetic particle attracted by magnetic drum and this particles adhere to for 10 to 12 sec on it. and strip provided on machine these particles are removed for drum and collected at backside of machine whereas the wheat grains are send to vibrating mesh .

#### **4. IMPROVEMENT OF MACHINE**

To improve in that machine, to added by magnetic drum in down side of the hopper and also to used both side of blower. The destoner consists of:

- trapezoidal working table with totally enclosed cover.
- woven wire mesh bed material (sized to suit product and changeable).
- robust supporting structure with anti vibratory mounts.
- air lock device on grain intake.
- good grain discharge outlet(s) with sleeve(s).
- stone outlet with sleeve.
- drive consisting of one or two vibratory motor(s) mounted to robust frame below table.
- pressure gauge (to assist air setting).

Materials enters the machine through the inlet air lock (which prevents ingress of air with the product. It then moves from the preliminary sieve to the trapezoidal working table. The working table is covered with a woven wire mesh bed, through which air flows from below. Heavy impurities such as stones are not lifted by the air cushion and stay on the mesh bed. The vibratory motion of the table causes this heavy material to be transported to the beginning of the regulating plate at the far end of the machine.

Under this plate, the air flows in an opposite direction to the movement of grain on the working table. Due to this direction of air motion stones are separated from the product and moved to the stones outlet.

The machine is fully adjustable to achieve the optimum separation in every case; the inclination of the working table, the stroke of the vibratory motor and the volume of the air used can all be regulated.

#### **5. FUTURE SCOPE**

In wheat cleaning machine various method is use to remove the stone.

By using magnetic principle to remove the stone in wheat cleaning machine near about 60%-70% of stone is removed. Due to this reason the efficiency of the machine will be reduced then to use gravity principal in machine to remove the the remaining 30-40 %of stone by using vacuumed pressure with the help of blower. In future to applying the vacuumed pressure in the wheat cleaning machine increase the efficiency of the machine nearly about 90-95 %.

#### **6. APPLICATION**

The product fed through an air shut-off gate after preliminary cleaning by gravity. The product passes on to an inclined oscillating deck. The deck is designed as screen; through which an upward current of air is passed with the help of a blower. This results in fluidizing the product. Due to their different specific gravities, the heavy particles such as stones sink to the bottom of this layer of fluidized material, while the lighter particles supported by the cushion of air, float on top. The oscillating action of the screen causes the heavy particles to work their way to the upper end of the deck. There is an adjustable counter of air, this causes the final separation of heavy particles from light material, and the stone discharged. The air volume can be adjusted to achieve the optimal degree of separation.



### **PART LIST**

<b>SR. NO.</b>	<b>SPARE PARTS</b>	<b>MATERIAL</b>
1	HOPPER	SHEETMETAL
2	MOTORS	_____
3	FRAME	M.S
4	MOTOR SHAFT	M.S
5	OUTLET SPOT	SHEETMETAL
6	BASE PLATE	C.I
7	LINK	M.S
8	BUSH	RUBBER
9	V -BELT	LEATHER
10	BLOWER	_____
11	HOPPER BLADE	SHEETMETAL
12	MAGNETIC DRUM	MAGNET
13	MESH	C.I

### **7. CONCLUSION**

Our Machine **FABRICATION OF WHEAT CLEANER**” is satisfactorily designed values; still there is scope for further development. We notice following points for development. The total construction material for the system can be changed to a more shock absorbing and high strength metal. A good foundation can efficiently increase the performance of unit. It can also be coupled with polishing and milling unit which can increase the productivity and efficiency. If instead of flat belt if V-belt is used power transmission will be increased and hence increasing the performance of the unit. If in agricultural field the WHEAT CLEANER is prominently used the paddy to wheat conversion will be more and efficient than traditional ways of removing husk, which will decrease the wastage of food grains leading to high productivity.

### **8. REFERENCES**

- [1]. “Elfverson, C. and S.Regner. 2000. Comparative precision of grain sieve and pneumatic classification on a kernel level. *Applied Engineering in Agriculture* 16(50:537-541.”
- [2]. “Harrison, H.P. and A.Blecha.1983.Screen oscillation and aperture size-sliding only.*Trasactions of the ASAE* 26 (2): 343-348.”
- [3]. “Influence of oscillating frequency on separation of wheat on a sieve in an air stream. *Transaction of the ASAE*12(3):886-888”
- [4]. “Agriculture Engineering International : the CIGR E journal. Manuscript FP 06020.Vol III.”
- [5]. “R.S.Khurmi and J.K.Gupta A text Book of Machine Design”, S.Chand Publication. Page no. 409-425.
- [6]. “Design Data Book” , S. Chand Publication. Page no.7.1-7.25.