DESIGN AND FABRICATION OF WHEAT SIEVING MACHINE

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ABSTRACT

The grain or wheat screening machine contains a stunning look and compact structure. Despite that, it's convenient to maneuver and straightforward to use. This machine owns the benefits of impurity removal potency and low energy consumption. The screen will modification at random per the user's needs, and also the sieves are appropriate for various material varieties. Improvement and tempering is a necessary part of the edge method. Winning management associate degreed management of the improvement and tempering operations will improve mill performance and avoid issues that end in an inflated value and reduced profit. This is often a really essential a part of the edge operation. In our project we have a tendency to reducing critically of the human. once farmer growing the wheat and {so} cutting so in this innumerable impurities, unwanted particles involves for that reducing the farmer work we have a tendency to manufacture the wheat improvement machine. conjointly we have a tendency to reducing the value. it's straightforward to maneuver one placed to a different, straightforward to handle, time saving, person operated simply.

**Keywords:** Sieving, Motor, Connecting Rod, Wheat, Grains, Nut, Bolt Etc.

I. INTRODUCTION

A farm machine or a thresher may be a piece of farm instrumentation that threshes grain, that is, it removes the seeds from the stalks and husks. It will thus by beating the plant to create the seeds fall out. Before such machines were developed, separation was done by hand with flails: such hand separation was terribly hard and long, taking concerning one-quarter of agricultural labour by the eighteenth century Mechanization of this method removed a considerable quantity of plodding from farm labour. The primary farm machine was fancied circa 1786 by the Scottish engineer St. Andrew Meikle, and therefore the resultant adoption of such machines was one in every of the sooner samples of the mechanization of agriculture. throughout the nineteenth century, threshers and mechanical reapers and reaper-binders bit by bit became widespread and created grain production a lot of less hard. Michael Stirling is alleged to possess fancied a rotary farm machine in 1758 that for forty years was wont to method all the corn on his farm at Gateside. No revealed works have nonetheless been found, however his son William created a sworn statement to his minister to the present truth. He additionally gave him the main points of his father's death in 1796.

![Fig 1: Wheat sewing machine](image1)

Separate reaper-binders and threshers have mostly been replaced by machines that mix all of their functions, that's mix harvesters or combines. However, the less complicated machines stay necessary as acceptable technology in low-capital farming contexts, each in developing countries and in developed countries on little farms that try for particularly high levels of self-reliance. as an example, pedal-powered threshers ar a low-priced possibility, and a few Mennonite sects use equid binders and old-style threshers. separation is simply one step of the method in obtaining cereals to the grinding mill and client. The wheat has to be mature, cut, stooked (shocked, bundled), haule, threshed, de-chaffed, straw baled, and so the grain hauled to a grain
elevator. For several years every one of those steps was a private method, requiring groups of employees and lots of machines. Within the steep hill wheat country of Palouse within the Northwest of the us, steep ground meant moving machinery around was problematic and susceptible to rolling. To cut back the quantity of labor on the sidehills, the thought arose of mixing the wheat binder and thresher into one machine, referred to as a mix harvester. About 1910, horse force combines appeared and became a hit. Later, gas and diesel engines appeared with alternative refinements and specifications. Modern-day mix harvesters (or merely combines) treat a similar principles and use a similar parts because the original separation machines inbuilt the nineteenth century. Combines conjointly perform the reaping operation at a similar time. The name mix springs from the actual fact that the 2 steps ar combined in a very single machine. Also, hottest combines ar self-powered (usually by a diesel engine) and self-propelled, though tractor powered , pull kind combines models were offered by Deere and Case International into the Nineteen Nineties. Today, as within the nineteenth century, the separation begins with a cylinder and acetabular. The cylinder has sharp notched bars, and rotates at high speed (about five hundred RPM), so the bars beat against the whole plant because it is automatically fed from the reaping instrumentation at the front of the mix to the gap between the acetabular and also the rotating beater/cylinder. The acetabular is arced to match the curve of the cylinder, and also the grain, currently separated from the plant stalks falls in real time through grated openings within the acetabular because it is crushed. The motion of the rotating cylinder thrusts the remaining straw and chaff toward the rear of the machine. While the bulk of the grain falls through the acetabular, the straw is carried by a collection of "walkers" to the rear of the machine, permitting any grain and chaff still within the straw to fall below. Below the straw walkers, an addict blows a stream of air across the grain, removing mud and tiny bits of crushed stuff out of the rear of the mix. The residues fall to the bottom and occasional ar collected for alternative functions, like fodder. The grain, either coming back through the acetabular or the walkers, meets a collection of sieves mounted on Associate in Nursing assembly referred to as a shoe, that is agitated automatically. The highest sieve has larger openings, and serves to get rid of massive items of chaff from the grain. The lower sieve separates clean grain, that falls through, from incompletely threshed items. The incompletely threshed grain is came to the cylinder by means that of a system of conveyors, wherever the method repeats. II. METHODOLOGY

Base: the bottom acts a support for the entire machine. It’s product of a iron. as a result of the load of the machine is high. we have a tendency to offer the electrical provide on it therefore the machine is vibrated and if we cannot offer the support therefore the machine get broken, iron is definitely on the market and principally used for base support In our project we have a tendency to iron sheet, rod, stands, hopper, motor, hopper, belt, flywheel, pulley, output material box, sieve, rod, inlet, wastage outlet. smart product outlet, and most significant a part of our project is wheat or grain etc.. The frame foot is supplied with four wheels for simple movement; the sieves will and therefore the frame adopts a split structure, that is straightforward to switch a spread of various things.

Fig 2: Wheat Sewing machine
The hopper is placed on top because easy to filled grains and moving on the sieve directly without any support. Also to the hopper provide the stopper i.e. we can also called output of hopper, because when grain is inserted so we can decide the speed of provide the grain to the machine in how much quantity to give good efficiency of the finish good in terms of wheat cleaning without dirt. Also another reason of provide hopper finding some issues like when the machine is stopped in between due to uncertain issues so the machine is stopped but without stopper from the hopper material i.e. wheat continuously flowing once it is not finished, because of that system accuracy decreases and suddenly if machine start so the grains is gone to be waste due to vibrations. Hence stopper is the required in hopper.

The motor mounted on the stand of iron on the motor pulley is attached and with that connecting rod is joint. The rod joint with the 1st stage of sieve of wheat. The four side rod our stand is called as base of the machine. The stand placed in L shape of 90oC angle four side and in that sieve is fixed and the sieve is connected to motor indirectly with the help of connecting rod, so the motor is started both the sieve is started moving left to right and vibrating, because of the vibration the higher or dense particles moves out from the sieve at the 1st upward and the remaining go to the 2nd stage in that also the fine particles removes in microlevel and at last received the wheat proper without dust or unwanted particles.

The hopper is connected to sieve one and sieved 2 indirectly. From the hopper the wheat is flowing at the 1st of sieve it is not much fine our concept is from the 1st step removed the dirt in terms of wooden strips more dense particles, stones, etc. as you can see the fig. from the 2nd sieve fine amount of dirt removed and clean the sieve.

Precautions of exploitation vibratory sieving machine
1. Don’t touch the operative a part of the instrumentality.
2. once beginning, the most fan ought to run within the direction indicated by the arrow.
3. If mechanical and electrical failure or abnormal noise happens throughout the operation of the instrumentality, then you ought to pack up the machine instantly to examine, that the hidden dangers is eliminated before traditional operation. instrumentality maintenance ought to be meted out by professionals, and you can’t dismantle key elements at can.
4. The protective covering can not be disassembled willy-nilly The wheat textile machine is employed In mill for separation of dirt, removing unwanted particles from the grains for the great quaility. the patron or the sell the merchandise in sensible quality. For making the machine we have a tendency to used motor, rod, hopper, hopper mechanism, sieve, stands, iron material, power offer, regulator for dominant the speed, storage on below facet, output given to induce fine grain while not dirt and dirt. The unwanted particles removes type the section one sieve then from the 2d sieve the remaining unwanted particles removed that terribly fine subsequently received the fine grain, as per the desired or the aim of machine is fullfield. Sieving could be a method by that fine particles area unit separated from larger particles by employing a sieve. it’s utilized in grinder or at construction sites. In grinder, impurities like husks and stones area unit aloof from wheat. Pebbles and stones area unit aloof from wheat by sieving.

As you see in within the fig. the hopper placed on prime aspect of the machine. The recess and outlet given to the hopper. From the hopper wheat or grains area unit inserted, it’s directly attend on sieve. The outlet given or stopper give to hopper as a result of if we offer continuous provide of wheat or grain and in between our
system is stuck because of electricity or the other reason thus we've got to prevent the stem. therein hopper the grains is fulled thus it's manual method or we have a tendency to cannot stop it's flowing on machine and dirt isn’t removing thus used outlet in hopper, additionally for dominant grain provide is management. once the facility provide give to motor. The motor mounted on the stand of iron on the motor simple machine is connected and thereupon rod is joint. The rod joint with the first stage of sieve of wheat. The four aspect rod our stand is termed as base of the machine. The stand placed in L form of 90° angle four aspect and therein sieve is fastened and therefore the sieve is connected to motor indirectly with the assistance of rod, therefore the motor is started each the sieve is started moving left to right and moving, owing to the vibration the upper or dense particles moves out from the sieve at the first upward {and the|and therefore the|and additionally the} remaining attend the 2d stage therein also the fine particles removes in microlevel and eventually received the wheat correct while not dirt or unwanted particles. Follow the below operating points:-

1. Place the grain screening machine during a horizontal position, and switch on the facility provide. Then begin the work switch to confirm that the motor rotates dextrorotary. It shows that the machine has entered the right operating state.
2. Pour the materials which require to be screened into the hopper, and so regulate the stopper plate at very cheap of the hopper in line with the dimensions of the fabric particles. The aim is to form the materials equally enter the higher screen.
3. make certain that the cylindrical fan on the higher a part of the screen will send air to the discharge finish of the screen properly. The air recess is at the lower finish of the fan, and so it may also be directly connected to the fabric bag to receive the sunshine miscellaneous waste within the grain.
4. The lower a part of the moving screen has four bearings, they fix severally within the channel steel on the frame for linear reciprocatory movement: the higher coarse screen of the screen is to wash massive particles of impurities within the material, and therefore the lower fine screen is to wash up little particles of impurities within the material. 5. Finally, you'll get clean wheat.

### III. CALCULATION

Consider,

- Weight = 5kg
- Crank radius= 20mm
- Connecting rod length= 175mm
- \( N = 1400 \text{rpm} \)
- \( \text{Force} = m \cdot w^2 \)
- \( W = 2 \pi \cdot N / 60 \)
- \( W = 146.60 \)
- \( \text{Power} = w \cdot \text{Torque} \)
- \( \text{Power} = 5088\text{N-mm} \)
- \( \text{Force} = 1.976\text{KN} \)
- \( \text{Velocity} = \pi \cdot d \cdot N / 60 \)
- \( \text{Velocity} = 2.932\text{ m/sec} \)
- \( \text{Weight} = \text{mass} \cdot \text{gravity} = 5 \cdot 9.81 \)
- \( \text{Weight} = 49.05\text{N} \)

\( \text{Force} > \text{weight} \)

Design is safe

**Machine efficiency**

- Power of motor = 746w for 1hours = 0.746 KW
- Unit consumption = 0.746 unit for 1 hours
- Let us consider we use 5 hours in a day
- Then, unit consumption for 1 month
Approximate price of 1 unit electricity cost about Rs. 10/unit

Solution:- Total expense for 1 month

= 10*111.9
Rs. 1119

Manpower efficiency

One hour labour cost = Rs. 50
Working 5 hours a day for 1 month

= 0*5*30
Rs. 7500

Net costing saving = 7500-1119
Rs.6381.

IV. ADVANTAGES

- Easy to handle
- Easy to operate
- Controlling the speed at the stage required
- Unskilled person can operate the machine
- For small business purpose can used Simple in construction.
- Nowadays, separation of different sizes of solid material is a need of hours; this project can be used for the separation of different sizes of solid only by changing mesh of required size.
- Compact in size and required less space.
- Less in weight.

V. FUTURE SCOPE

This section presents the possible future directions to extend the presented work.

1) We can do fully automatic using IOT or AI
2) Design for multipurpose
3) Reduce weight of machine.

VI. CONCLUSION

Concluding the project up to currently once analysis four differing kinds of sieving machine was conceptualized to pick the simplest considering each issue to form it a lot of economical, transportable and simply operable. per calculations and assumptions, this sort of sieving machine are economical and simply operable, which may facilitate society to find out new means of sieving the target of our project was palm of wheat household appliance, we tend to get the result satisfactory. we've used mechanical mechanism during this project. This machine is simple to control. Our aim is that the merchandise ought to be utilized in each home. Or the machine may also be used for business purpose. is light-weight weight simple to control. Our project cost accounting is incredibly less. it’s most cost-effective project simply poor individuals should buy the machine.

VII. REFERENCES


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